Activity Quick-Link Table

Discipline	Scoping Stage (1)	Geometry Stage (2)	Plan-in-Hand Stage (3)	PS&E Stage (4)	Advertising Stage (5)
Aesthetics/ Landscaping (A)	1A1	2A1	3A1	4A1, 4A2	5A1
Survey/ Mapping (B)	1B1	4B1			
ITS (ATMS) (C)	1C1		3C1	4C1	
Environmental (E)	1E1	2E1	3E1, 3E2	4E1	5E1
Geotechnical (G)	1G1		3G1, 3G2, 3G3	4G1, 4G2, 4G3	
Structure Hydraulics (H)		2H1		4H1	
ROW Design (J)	1J1	J1A, J2A			
ROW Region (K)		K1A			
ROW Acquisition (L)		L1A, L2A, L3A, L4A, L5A			5L1
Materials (M)		2M1			
Public Involvement (P)	1P1			4P1	
Roadway Hydraulics (Q)	1Q1	2Q1, 2Q2	3Q1, 3Q2	4Q1	
Roadway (R)	1R1	2R1	3R1, 3R2, 3R3	4R1, 4R2, 4R3	
Structures (S)	1S1	3S1, 3S2, 3S3, 3S4, 3S5, 3S6		4SA, 4SM, 4S1, 4S2, 4S3, 4S4	5S1
Traffic & Safety (T)	1T1	2T1	3T1		
Utilities (U)	2U1		3U1, 3U2, 3U3, 3U4	4U1, 4U2, 4U3	5U1
Meetings (V)	1V1, 1V2	2V1	3V1	4V1	5V1
Design Leader (Y)	1Y1, 1Y2	2Y1	3Y1	4Y1	5Y1
Project Management (Z)	1Z1, 1Z2, 1Z3, 1Z4, 1Z5		3Z1, 3Z2, 3Z3	4Z1, 4Z2	5Z1, 5Z2

This page intentionally left blank

Project Delivery Network

Preface

The *Project Delivery Network* is a template outlining the stages, activities, and tasks used for producing successful projects. Specifically, the network assists Project Managers and other team members complete the following tasks:

- Maintain consistency with other project delivery phases (e.g. concept, environmental, and construction phases).
- Easily setup design projects in ePM.
- Outline the steps of the design phase in a logical manner.
- Assign appropriate discipline resources to design activities and track project status.
- Provide team members with logical activities for tracking time and determining project status.
- Streamline the design process when possible.
- Focus on project delivery goals at appropriate project stages.
- Provide a systematic review process.

Project Stages

The *Project Delivery Network* is divided into the following five stages:

1. Scoping
2. Geometry
3. Plan-in-Hand
4. PS&E (Plans, Specials, and Estimate)
5. Advertising

Each stage is concluded with a milestone review meeting to assess the status of the project and review project designs.

The following is a short outline of the goals for each project stage:

Scoping

- Setup project activities and organize the project team.
- Hold a Kickoff meeting to develop an understanding of the project objectives.
- Review known project information and research additional information needed to develop the scope, schedule, and budget.
- Determine the project scope, schedule, and budget.
- Hold a scoping meeting to coordinate and finalize the project scope, schedule, and budget with all team members.
- Determine the design effort and a strategy for delivering critical elements of the project within the scheduled time.
- Negotiate resources, establish the project budget, and set a baseline in ePM.

Project Delivery Network

Geometry

- Determine the recommended horizontal and vertical alignments.
  - Develop initial roadway model
  - Identify potential design and utility conflicts
  - Identify preliminary cut/fill lines and initial ROW impacts
- Develop preliminary designs and perform preliminary testing.
- Analyze environmental resources and conduct environmental research.
- Right-of-way (ROW) managers meet to determine the initial ROW needs for the project.
- Prepare preliminary unit cost estimates.
- Hold the Geometry Review meeting to review and discuss the preliminary design, potential conflicts, and cost estimate.

Plan-in-Hand

- Finalize the project roadway model.
- Write the categorical exclusion document, obtain approval and start the permitting process
- Begin the ROW appraisal process begins for the early acquisition parcels, and the final ROW plans are completed along with a final estimate for all ROW parcels.
- Each discipline completes their design and develops preliminary plan sheets.
- The Plan-in-Hand review meeting (3V1) gives the team members an opportunity to review and discuss the final model.
- All cost estimates are revised.

PS&E

- Finalize all designs based the Plan-in-Hand reviews.
- Complete all plan and profile sheets.
- Develop and finalize all detail plan sheets.
- Develop the final ROW plans, final appraisals are underway, and, if necessary, start property condemnation and owner relocations.
- Finalize all project documents including all reports, special provisions, cost estimates, summary sheets, etc.
- At the PS&E review meeting team members review and discuss the plans and project documents.

Advertising

- Make final revisions to designs, plans, and documents based on input from the PS&E review meeting.
- Hold Final Comment Resolution meeting to ensure all previous comments are addressed.
- Compile the project advertisement package. The package includes the final structure acceptance, the storm water pollution prevention plan (SWPPP), plan sheets, specifications, summaries, etc.
- This stage ends with project advertisement.

Project Activities

Each stage contains multiple activities. This handbook outlines each activity and contains an Overview, References List, Deliverables List, Distribution List, Responsibility Chart, and a description of each task. These are to be used as guidelines and should be adapted for each project's unique context.

Each activity is numbered for ePM tracking purposes. The following is the general numbering system for all activities: (Completion Stage Number)(Discipline Designation)(Identifying Number).

An example of the general number system is **3G2**. (**3**) Indicates the activity is to be completed in the Plan-in-Hand Stage. (**G**) Identifies it as Geotechnical discipline track. (**2**) Is the activity identifier within the stage and discipline track.

The exception to the general number rule occurs in the Structures PS&E stage and the Right of Way discipline track. See *Project Delivery Network Flowchart* notes 1 and 2 for further information.

In each activity, a **Responsibility Chart** shows the deliverables, recommended tasks, and the responsible party for the activity and each task. The **Activity Leader** is the member of the design team who is responsible to see that the activity is completed successfully. While the activity leader is responsible for the activity, there may be other team members who are responsible for the completion of specific tasks. The chart indicates with an X the responsible party for each task. The chart is not intended to list all team members involved in the successful completion of the activity. They may delegate the completion of specific tasks to other team members.

An example of a Responsibility Chart is found below.

Deliverable	Task	Responsible Party	
		Activity Leader	
		Central ROW	Acquisition Agent
Purchase Contract	▪ Set Up files	X	
	▪ Initiate Negotiations		X
	▪ Obtain Right to Occupy, Acquire Property, or Recommend Alternate Resolutions		X
	▪ Submit File for Approval or Condemnation		X

In this example, the representative of Central ROW is the Activity Leader and responsible for the completion of the task *Set Up Files.* The Acquisition Agent representative is responsible for the completion of the remaining tasks.

The listed order of tasks is not necessarily the chronological order of completion.

Total Project Cost Estimate and Engineer's Estimate

Each discipline is responsible to complete and update a cost estimate for their design. The disciplines submit their cost estimates to the design leader for inclusion in the Total Project Cost Estimate before each milestone meeting. Create the engineer's estimate in UDOT's Project Development Business System (PDBS) during the PS&E stage.

The Total Project Cost Estimate is the complete list of all costs associated with the project, including: Project Engineering, ROW, Utilities, Environmental Mitigation, Construction (including: Roadway and Drainage, Traffic and Safety, Structures, and Intelligent Transportation Systems (ITS), etc.), Construction Engineering, Incentives, Contingencies, and Miscellaneous. Use the Concept Project Cost Estimate as the template for the Total Project Cost Estimate.

Project Coordination

Coordination is essential for project success. Coordination and communication between disciplines on the project team and with outside agencies and consultants is necessary to deliver a successful project that meets project goals, on schedule, and within budget.

Potential disciplines for project team coordination may include, but are not limited to, the following:

Utah Department of Transportation (UDOT) Disciplines
Project Management
Roadway
ROW
Utilities
Hydraulics
Traffic and Safety
ITS (Automated Traffic Management System (ATMS))
Structures
Geotechnical
Materials
Multi-Modal
Environmental
Landscape Architecture
Survey and Mapping
Public Involvement (PI)

Outside agency contacts may also include, but are not limited to, the following:

Federal Agency
Federal Highway Administration
USDA—Forest Service
Bureau of Reclamation
Bureau of Land Management
National Park Service
U.S. Fish and Wildlife
U.S. Natural Resources Conservation
Bureau of Indian Affairs
Internal and External Stakeholders

State Agencies
State Land Board
State Parks and Recreation
Local Governments
Utah Travel Council
Law Enforcement
Local Emergency Services
Region Operation Engineer
Maintenance Station Supervisors
Indian Nations
Railroads
Irrigation Companies
Private Property Owners

Quality Control /Quality Assurance (QC/QA)

QC/QA is required for every project. The follow requirements must be met:

- Adhere to an approved written QC/QA process (either *UDOT QC/QA Procedures* or other approved QC/QA plan)
- Maintain a project *Responsibility Chart (5Z1)*
- Provide QC/QA documentation for every deliverable

The *UDOT QC/QA Procedures* address the purpose, responsibilities, procedures, and documentation for QC/QA. In addition, the *Project Delivery Network QC Checklists* are provided to assist project teams in performing thorough, accurate, and consistent QC reviews. For more information, refer to the UDOT Project Delivery Network Website.

QC/QA is documented through the following:

- QC Cover Sheets – Upload onto ProjectWise a cover sheet with signatures verifying the QC process was completed **before** the deliverable is distributed. Assessment forms or report cover sheets signed by both originator and QC checker may be used as cover sheets.
- QA Review Cover Sheet - **Before** each milestone meeting and advertising, the QA Auditor verifies all QC Cover Sheets are complete, signs the QA review cover sheet, and uploads it onto ProjectWise.

Conclusion

The *Project Delivery Network* is intended to be a dynamic document. UDOT encourages suggestions and comments from users of the network to improve the design process. By providing comments, you will help make this document a more useful tool for everyone. Submitted comments will be reviewed on a regular basis for implementation by UDOT Project Development. To submit comments, please send them to DNcomment@utah.gov.

This page intentionally left blank

1A1 Assess Project Aesthetics and Landscaping

(back to table)

Overview

Based on the project type and its physical and social setting, determine the level of aesthetics and landscaping to be incorporated into the project.

References

- ☐ UDOT Aesthetics Guidelines
- ☐ Project Aesthetics Plan Development and Review
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary Aesthetics and Landscaping Assessment Form

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Aesthetics Committee

Deliverable	Task	Responsible Party Activity Leader Region Landscape Architect (Overview and Coordination)
Preliminary Aesthetics and Landscaping Assessment Form	▪ Determine Level of Aesthetics and Landscaping	X
	▪ Determine Project Funding	X
	▪ Complete Preliminary Aesthetics and Landscaping Assessment Form	X
	▪ Initiate QC Review	X

Determine Level of Aesthetics and Landscaping

Based on the project type, determine the appropriate level of aesthetics and landscaping.

- Projects are subject to aesthetics review if they fall under any of the following types:
  - Capacity increase
  - New structures
  - Intersection improvements
  - Transportation enhancement projects within UDOT's right-of-way.

    - Projects not occurring under one of these categories are typically exempt from the aesthetics review process (Tasks 2A1, 3A1, and 4A2 will not be necessary)
- For projects meeting the criteria for an aesthetics review, meet with Project Manager to determine the appropriate aesthetics level (high, medium, or low) to be applied to the project. Consider the project type along with its physical and social setting.
- For projects where it is not necessary to incorporate aesthetics and landscaping, determine if general roadside revegetation will be required (e.g., topsoil, seeding), if yes, provide this work under activity 4A1.

Determine Project Funding

For warranted projects, determine the amount of project funds to be used on project aesthetics and landscaping.

- Determine what percentage above the baseline that will be allocated to project aesthetics and landscaping up to a maximum of one percent of the estimated construction costs.
- Consider the aesthetics level assigned to the project.
- Meet with local government(s) to determine their interest in participation.

Complete Preliminary Aesthetics and Landscaping Assessment Form

- Complete the Preliminary Aesthetics and Landscaping Assessment Form. Submit the form to the Aesthetic Committee and the Design Leader for discussion in the Scoping Meeting.
- Review and document commitments related to aesthetics and landscaping made in the environmental document.

Initiate QC Review

Review the Preliminary Aesthetics and Landscaping Assessment Form with a QC Checker to verify the findings, assumptions, plan, costs, and schedule.

2A1 Develop Aesthetics and Landscape Conceptual Design

(back to table)

Overview

Create the overall project aesthetics and landscape conceptual design. Coordinate with other disciplines to incorporate features that enhance the project aesthetics.

References

- ☐ UDOT Aesthetics Guidelines
- ☐ Project Aesthetics Plan Development and Review
- ☐ Project Preliminary Aesthetics and Landscaping Assessment Form
- ☐ UDOT CADD Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Project Aesthetics and Landscape Conceptual Design Package
- ☐ QC Cover Sheet

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Region Landscape Architect

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Landscape Architect	Region Landscape Architect
Project Aesthetics and Landscape Conceptual Design Package	▪ Coordinate with Local Municipality		X
	▪ Develop Aesthetics and Landscape Conceptual Design Package	X	
	▪ Prepare Conceptual Drawings	X	
	▪ Prepare Landscape Treatments Plan	X	
	▪ Review Aesthetics and Landscape Conceptual Design Package		X
QC Cover Sheet	▪ Initiate QC Review	X	

Coordinate with Local Municipality

Determine the local municipality's needs and their involvement in the aesthetics and landscaping improvements.

- Clearly define the project baseline conditions and what constitutes a betterment, which would need to be funded by the municipality.
- Clearly define the municipality's long term responsibilities for maintenance and water supply of any landscape improvements and obtain necessary agreement.
- Obtain a letter of commitment for betterments from the municipality.

Develop Aesthetics and Landscape Conceptual Design Package

Develop aesthetics and landscape conceptual design package(s) based upon aesthetics budget determined under 1A1.

- Develop a theme(s) or design concept(s) that will visually unify all project components.
- Coordinate with Region Landscape Architect to determine if local government has suggested possible themes and their interests in contributing additional funding to the project.
- Follow direction provided in UDOT's Aesthetic Guidelines.
- Submit complete Aesthetics and Landscape Conceptual Design Package(s) to the Region Landscape Architect for review.

Prepare Conceptual Drawings

Provide conceptual drawings, renderings, elevations, perspectives that adequately show how the design theme is applied to all components of the project.

- Provide drawings that are drawn to scale.
- Provide drawings indicating anticipated textures applied to various surfaces. Provide details indicating textural relief depths.
- Provide drawing indicating what colors are being applied to various surfaces. Use federal standard 595B colors.
- If different structure types are being used on the project, show how the design theme relates to all structural elements.

Prepare Landscape Treatments Plan

- Prepare a plan showing generalized levels of landscape treatments being used on the project.
- Distinguish graphically on the plan the different landscape treatments of high, medium, and low and treatments to be included in each level.
- Distinguish between hardscape and softscape items.
- Include general information about the landscape palette.

Review Aesthetic and Landscape Conceptual Design Package

- Review submitted package(s) for completeness and for compliance with the aesthetic guidelines.
- Provide Project Landscape Architect with comments.
- Submit approved package(s) to the Aesthetics Committee.

- Address and incorporate Aesthetic Committee comments.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

3A1 Complete Aesthetics and Landscape Design

(back to table)

Overview

Create the overall project aesthetics and landscape conceptual design. Coordinate with other disciplines to incorporate features that enhance the project aesthetics.

References

- ☐ UDOT Aesthetics Guidelines
- ☐ Project Aesthetics Plan Development and Review
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Aesthetics/Landscape Comment Resolutions
- ☐ Final Aesthetics Plan
- ☐ Landscape/Irrigation/Site Design
- ☐ Aesthetics/Landscape Cost Estimate
- ☐ Aesthetic/Landscape Agreement(s)
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Aesthetics Committee

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Landscape Architect	Region Landscape Architect (Oversight and Coordination)
Aesthetic/Landscape Comment Resolutions	▪ Address Aesthetic and Landscape Comments	X	
Final Aesthetics Plan	▪ Complete Final Aesthetics Plan	X	
Landscape/Irrigation/Site Design	▪ Complete Landscape Design	X	
	▪ Complete Irrigation Design	X	
	▪ Complete Site Plan Design (if needed)	X	
Aesthetics/Landscape Cost Estimate	▪ Finalize Landscape/Aesthetics Cost Estimate	X	
Aesthetic/Landscape Agreement(s)	▪ Obtain Signed Aesthetic/Landscape Agreements from Local Government		X
QC Cover Sheets	▪ Initiate QC Review	X	

Address Aesthetic and Landscaping Review Comments

Address landscape and aesthetic related comments. See *UDOT QC/QA Procedures* for more information about completing comment resolutions. Revise the aesthetic and landscaping design based on reviewer comments and discussions.

Complete Final Aesthetics Plan

Provide final drawings showing the aesthetic treatments applied to all project structural elements.

- Provide construction drawings and details for all structural elements incorporated into the project and show aesthetic treatments. Include the following items:
  - Abutments
  - Parapets
  - Bridge monuments
  - Piers and caps
  - Girders
  - Retaining walls
  - Noise walls
  - Wing walls
  - Lighting and foundations
  - Railings/Fences
  - Barriers
  - Slope paving

- Provide drawings indicating the surface treatments (texture and color) applied to all structural elements. Provide details indicating textural patterns and relief depths. Use federal standard 595B colors.
- If different structure types are being used on the project, show how the selected design theme relates to all structural elements.
- Show transitions or connections between various elements (e.g., parapets to barriers, piers to caps, girders to abutments, retaining walls to abutments, etc.).

Complete Landscape Design

Provide final schematic landscape drawings showing the following items (if included on the project):

- Plant layout, types, sizes
- Decorative rock mulch: size and color
- Bark mulch areas
- Landscape boulders
- Mow strips
- Grading

Complete Irrigation Design

Provide final schematic irrigation drawings showing the following items (if included on the project):

- Conform to local municipal requirements.
- Develop irrigation zones for plantings.
- Obtain utility company and/or municipal approval for connect points.
    - Develop water source connections for each irrigation system.
    - Develop electrical source connections for each irrigation system.
- Design each irrigation system.
    - Stop and waste valve
    - Backflow preventer
    - Filter and pressure reducer
    - Controller
    - Control wiring
    - Control valves (include valve number and flow rate)
    - Mainline (include sizing)
    - Laterals (include sizing)
    - Sleeves (include sizing)
    - Heads (include nozzle size and flow rate)
    - Drip zones
    - Emitters and bubblers (flow rate)
- Coordinate materials with loading requirements.
- Include two (2) conduits (one electric & one water) at each location.
- Obtain a proprietary letter from the local municipality.

Complete Site Plan Design (if needed)

Provide final schematic of streetscape design or site layout (i.e., rest areas, welcome centers) and their amenities including the following items (if included on the project):

- Sidewalk/Hardscape treatments (include: materials, textures, colors, joint layout, and dimensions).
- Park strip treatments (include: materials, textures, colors, joint layout, and dimensions)
- Planters
- Trash receptacles (type and placement)
- Transportation buildings (e.g., restrooms, port of entry, visitor's center)
- Parking layout (e.g., handicap stalls and ramps, striping, signage, lighting, islands, and curbing)
- Picnic tables and benches
- Pavilions
- Out-buildings (e.g., pump stations, maintenance sheds)
- Kiosks, monuments
- Trails, trail signage, interpretive signage

Finalize Landscape/Aesthetic Cost Estimate

- Compile landscape/aesthetic bid items and quantities.
  - Use UDOT standard bid items.
- Develop unit costs for each item.
  - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.).
  - Document unit cost development, assumptions, etc.
  - Account for project specific factors (see below).
- Use lump sum pricing only when appropriate.
  - Consider contractor risk due to unknown quantity.
  - Consider difficulty in pricing per unit.
  - Consider all materials and labor involved.

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Time of year	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Specialty equipment	Constructability

Obtain Signed Aesthetic/Landscaping Agreement(s) from Local Government

- If landscape improvements, ornamental lighting, irrigation, and/or powder coated poles are incorporated into the project, prepare and execute a maintenance agreement between UDOT and the local government that commits the local government to long-term maintenance of these features.
- Prepare and execute a final agreement for betterments the local government wants to add to the project. Ensure cost estimates for betterments are accurate.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

4A1 Complete Erosion & Sediment Control Plans and Documents

(back to table)

Overview

Develop the project erosion and sediment control design. Complete the erosion and sediment control plans and create summaries. Prepare and assemble erosion and sediment control project documents, including plans, special provisions, and Engineer's Estimate in PDBS.

References

- ☐ UDOT Storm Water Information and Permitting Website
- ☐ UDOT Erosion and Sediment Control Field Guide
- ☐ UDOT Erosion and Sediment Control Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Standard and Supplemental Specifications
- ☐ Specification Writer's Guide
- ☐ Measurement and Payment Template
- ☐ Acceptance and Documentation Guide
- ☐ Project Development Business System
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Erosion and Sediment Control Plans
- ☐ Erosion and Sediment Control Cost Estimate
- ☐ Erosion and Sediment Control Project Documents
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Landscape Architect or Roadway Hydraulics Designer	Region Landscape Architect (Oversight and Review)
Erosion and Sediment Control Plans	▪ Design Erosion and Sediment Control Elements	X	
	▪ Complete Erosion and Sediment Control Plans Sheets	X	
	▪ Complete Erosion and Sediment Control Detail Sheets	X	
	▪ Complete Erosion and Sediment Control Summary Sheets	X	
Erosion and Sediment Control Cost Estimate	▪ Finalize Erosion and Sediment Control Cost Estimate	X	
	▪ Enter Erosion and Sediment Control Cost Estimate into PDBS	X	
Erosion and Sediment Control Project Documents	▪ Prepare Erosion and Sediment Project Documents	X	
QC Cover Sheets	▪ Initiate QC Review	X	

Design Erosion and Sediment Control Elements

- Design the location of erosion and sediment control elements using *UDOT's Erosion and Sediment Control Field Guide* to stabilize disturbed soil during construction and to capture and remove sediment from storm water runoff.
- Comply with UPDES requirements.
- Evaluate the erosion and sediment control needs for all construction phases.
- Select temporary erosion and sediment control measures.
- Develop locations for erosion and sediment control best management practices (BMPs).
- Use UDOT standard BMPs as much as possible.
- Coordinate with Region Landscape Architect to determine the need for an Environmental Control Supervisor.
- Determine areas requiring seeding and develop appropriate seeding schedule based on soils, precipitation, and elevation.

Complete Erosion and Sediment Control Plan Sheets

- Complete all erosion and sediment control plan in accordance with UDOT standards.
  - Conform to *UDOT CADD Standards*
  - Conform to *UDOT Plan Sheet Development Standards*
    - General plan sheet requirements
- Maintain CADD standards on each sheet (i.e. lines styles shown correctly, cell scaling, etc.).
- Include all necessary notes, callouts, legends, etc.
- Identify and reference standard drawings and details.

- Clearly organize all information.
- Place a legend on each sheet.
- Identify all temporary erosion and sediment control measures.
- Include all necessary permanent stabilization requirements as indicated below and identify locations on erosion and sediment control plans or on other appropriate plans.
    - Topsoil (include: depth, limits, total area)
    - Seed (include: limits -shown graphically, total area)
    - Mulch (include: limits)
    - Erosion control blanket (include: limits - shown graphically, total area)
    - Rock of fabric-lined ditches/swales (include: limits – shown graphically, total area)
- Match all pay item callouts exactly with the cost estimate.

Complete Erosion and Sediment Control Detail Sheets

Develop all non-standard details necessary for construction and detail plan sheets.

- Conform to UDOT Standards
    - UDOT Erosion and Sediment Control Manual
    - UDOT CADD Standards
    - UDOT Erosion and Sediment Control Field Guide
    - UDOT Standard and Supplemental Drawings
- Prepare detail plan sheets in accordance with *UDOT Plan Sheet Development Standards*.
    - General Plan Sheet Requirements
    - Detail Sheet Requirements
    - Include all necessary notes, callouts, dimensions, symbols, etc.
    - Use identifiable symbols and line styles.

Complete Erosion and Sediment Control Summary Sheets

- Prepare summary sheets in accordance with *UDOT Plan Sheet Development Standards* and *Summary Sheet CADD Standards*.
    - General Plan Sheet Requirements (Department or Region)
    - Summary Sheet Requirements
- Use UDOT Excel spreadsheets and customize for the project.
    - Include all erosion and sediment control related pay items and necessary non-pay items.
    - Include names, alignment designations, stations, offsets, units, and quantities.
    - Show enough detail to support calculations.
- Use UDOT standard summary plan sheets.
    - Export all summaries from Excel to Microstation.

Finalize Erosion & Sediment Control Cost Estimate

- Update bid items and quantities.
- Update unit costs.

Upload Roadway Estimate to PDBS

Prepare Erosion and Sediment Control Documents

- Provide all special provisions required for project construction.
  - General Special Provisions
  - Project Specific Special Provisions
  - Use *Specification Writer's Guide*.
  - Include local municipality specifications.
- Generate M&P for all bid items.
  - Develop M&P for all non-standard bid items.
  - Use the current *Measurement and Payment Template*.
  - Include accurate description for all effort and materials required for construction.
  - M&P pay items must match plan sheet pay items exactly.
- Generate A&D for all standard pay items.
  - Use the Acceptance and Documentation Guide.
  - Coordinate with the RE to develop A&D for non-standard items.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

4A2 Complete Aesthetics, Landscape, Irrigation, and Site Plans and Documents (back to table)

Overview

Revise design based on review comments. Complete landscape, irrigation, and site plans and documents. Finalize the aesthetic and landscaping cost estimates.

References

- ☐ UDOT Aesthetics Guidelines
- ☐ Project Aesthetics Plan Development and Review
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT CADD Standards
- ☐ Specification Writer's Guide
- ☐ Measurement and Payment Template
- ☐ Acceptance and Documentation Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Landscape/Irrigation/Site Plan Comment Resolutions
- ☐ Landscape/Irrigation/Site Plan Sheets
- ☐ Landscape/Irrigation/Site Cost Estimate
- ☐ Landscape/Irrigation/Site Plan Documents
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Region Landscape Architect

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Landscape Architect	Region Landscape Architect
Landscape/Irrigation/Site Plan) Comment Resolutions	▪ Address Review Comments	X	
Landscape/Irrigation/Site Plan Sheets	▪ Complete Plan Sheets	X	
	▪ Complete Detail Design and Sheets	X	
	▪ Complete Summary Sheets	X	
Landscape/Irrigation/Site Plan Cost Estimate	▪ Finalize Landscape/Irrigation/Site Plan Cost Estimate	X	
	▪ Enter Landscape/Irrigation/Site Plan Estimate into PDBS	X	
Landscape/Irrigation/Site Plan Documents	▪ Prepare Landscape/Irrigation/Site Plan Documents	X	
QC Cover Sheets	▪ Initiate QC Review	X	

Address Review Comments

Address landscape and aesthetic related comments. See *UDOT QC/QA Procedures* for more information about completing comment resolutions. Revise the design based on review comments.

Complete Plan Sheets

Following the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards*, generate the landscape plan sheets. Develop irrigation and site plan sheets for the project if applicable. Combine sheets when appropriate.

For **all plan sheets**, do the following:

- Conform to UDOT Plan Sheet Development Standards General Plan Sheet Requirements.
- Maintain CADD standards on each sheet (i.e. lines styles shown correctly, cell scaling, etc.).
- Provide sheets at appropriate scale to clearly identify sheet symbols.
- Include all necessary notes, callouts, legends, etc.
- Identify and reference standard drawings and details.
- Identify all proposed and existing facilities.
- Clearly organize all information.
- Match all pay item callouts exactly with the cost estimate.
- Reference appropriate project files.

For **landscape** plan sheets, do the following:

- Identify surface treatments (e.g., mulch, seeding, pavement).

- Clearly label and provide a legend for landscape materials.
- Include Grading (e.g., contours, slopes, and drainage).
- Include Planting plan (e.g., symbols).
- Include Plant legends (e.g., symbol, botanical name, size, and quantity).
- Include Topsoil depths.
- Include seed schedule.

For **irrigation** plan sheets, do the following:

- Clearly label and provide a legend for irrigation components:
  - Water point of connection (e.g., water meter, well, or tap and responsibility)
  - Power point of connection (e.g., electrical meter or source and responsibility)
  - Stop and waste valve
  - Backflow preventer
  - Filter and pressure reducer
  - Controller
  - Control valves (include valve number and flow rate)
  - Mainline (include sizing)
  - Laterals (include sizing)
  - Sleeves (include sizing)
  - Heads (include nozzle size and flow rate)
  - Drip zones
  - Emitters and bubblers (flow rate)
- Provide an irrigation legend (symbols, description, and quantity).
- Include 90-day irrigation establishment schedule.
- Provide Final irrigation schedule.

For **streetscapes** and **site plan** sheets, include the following:

- Sidewalk/hardscape treatments (include: materials, textures, colors, joint layout, and dimensions)
- Park strip treatments (include: materials, textures, colors, joint layout, and dimensions)
- Planters
- Trash receptacles (type and placement)
- Transportation buildings (e.g., restrooms, port of entry, visitor's center)
- Parking layout (e.g., handicap stalls and ramps, striping, signage, lighting, islands, and curbing)
- Picnic tables and benches
- Pavilions
- Out-buildings (e.g., pump stations, maintenance sheds)
- Kiosks, monuments
- Trails, trail signage, interpretive signage

Complete Detail Design and Sheets

Develop all non-standard details necessary for construction and detail plan sheets.

- Conform to UDOT Standards.
  - UDOT Erosion and Sediment Control Manual

  - UDOT CADD Standards
  - UDOT Erosion and Sediment Control Field Guide
  - UDOT Standard and Supplemental Drawings
- Prepare detail plan sheets in accordance with *UDOT Plan Sheet Development Standards*.
  - Conform to General Plan Sheet Requirements.
  - Conform to Detail Sheet Requirements.
  - Include all necessary notes, callouts, dimensions, symbols, etc.
  - Use identifiable symbols and line styles.

Complete Summary Sheets

- Prepare summary sheets in accordance with *UDOT Plan Sheet Development Standards* and *Summary Sheet CADD Standards*.
  - Conform to General Plan Sheet Requirements (Department or Region).
  - Conform to Summary Sheet Requirements.
- Use UDOT Excel spreadsheets and customize for the project.
  - Include all roadway related pay items and necessary non-pay items.
  - Include names, alignment designations, stations, offsets, units, and quantities.
  - Show enough detail to support calculations.
- Use UDOT standard summary plan sheets.
  - Export all summaries from Excel to Microstation.

Finalize Landscape/Irrigation/Site Plan Cost Estimate

- Update bid items and quantities.
- Update unit costs.

Upload Landscape/Irrigation/Site Plan Estimate to PDBS

Prepare Landscape/Irrigation/Site Plan Documents

- Provide all special provisions required for project construction.
  - General Special Provisions
  - Project Specific Special Provisions
  - Use *Specification Writer's Guide*.
  - Include local municipality specifications.
- Generate M&P for all bid items.
  - Develop M&P for all non-standard bid items.
  - Use the current *Measurement and Payment Template*.
  - Include accurate description for all effort and materials required for construction.
  - M&P pay items must match plan sheet pay items exactly.
- Generate A&D for all standard pay items.
  - Use the Acceptance and Documentation Guide.
  - Coordinate with the RE to develop A&D for non-standard items.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

5A1 Prepare SWPPP Package for Construction

(back to table)

Overview

Prepare the SWPPP package and submit to the Resident Engineer.

References

- ☐ Utah Department of Environmental Quality, Division of Water Quality
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ SWPPP Package
- ☐ QC Cover Sheet

Distribution

- ☐ Resident Engineer
- ☐ ProjectWise
- ☐ Project Manager
- ☐ Region Landscape Architect

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Landscape Architect or Roadway Designer	Region Landscape Architect
Completed SWPPP Package	▪ Assemble SWPPP Package	X	
	▪ Send SWPPP Package to Resident Engineer		X
QC Cover Sheet	▪ Initiate QC Review	X	

Assemble SWPPP Package

Follow UDOT's SWPPP Outline found on UDOT's environmental webpage. Assemble the package and fill in the necessary information. Provide two copies of the SWPPP Package to the Region Landscape Architect.

Send SWPPP Package to Resident Engineer

Review SWPPP Package and provide copies to the Resident Engineer.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

This page intentionally left blank

1B1 Develop Base Mapping/Existing Surface

(back to table)

Overview

Obtain base mapping and topography for the entire project area.

References

- ☐ UDOT Mapping and Aerial Photogrammetry Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ Survey Control Sheet
- ☐ Base Mapping
- ☐ Base Mapping File Certification

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Roadway Designer

Deliverable	Task	Responsible Party	
		Activity Leader	
		Surveyor	Survey CADD Technician
Survey Control Sheet	▪ Establish Survey Control	X	
	▪ Complete Survey Control Sheet		X
Base Mapping	▪ Perform Topographical Survey of Existing Features in Project Area	X	
	▪ Develop Base Mapping		X
	▪ Develop DTM of the Existing Surface		X
Base Mapping File Certification	▪ Complete Certification	X	

Establish Survey Control

Choose a basis of bearing that is compatible with all adjacent projects (i.e., past, present, and future projects). By using the same basis of bearing, data can be easily shared between projects, lessening the likelihood of significant errors.

- Determine the type of survey based on the current *UDOT Mapping and Aerial Photogrammetry Manual*
- The basis for the survey should include the following:
  - Section Corners
  - Existing ROW Markers
  - USGS Monuments
  - State Plane Coordinate System
  - Local Survey Monuments
  - Project Specific Control Monuments
  - Latitude, Longitude, and Height
  - Project Coordinates
  - Section, Township, and Range
- Control points need to have northing, easting, and elevation with equivalents in the State Plane Coordinate System
- If appropriate, include a paragraph describing the project parameters or the basis of bearing with primary control monuments
- Identify the bearing and distance between found section corners
- Clearly identify the use of U.S. Survey Feet or International Feet and the level of accuracy

Complete Survey Control Plan Sheets

Conform to *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to complete the Survey Control Plan Sheet(s).

- Conform to the General Plan Sheet Requirements
- Conform to the Title Sheet & Sheet 1's requirements
- Include all necessary notes, callouts, dimensions, symbols, etc.
- Use identifiable symbols and line styles

Perform Topographical Survey of Existing Features in Project Area

Provide a text file, including survey point numbers, northing and easting coordinates, elevations, and descriptions. Provide a MicroStation file with survey point numbers, elevations, and descriptions displayed. Provide a copy of all field notes made during the survey. All work should be done in accordance with *UDOT CADD Standards*.

Develop Base Mapping

All work should be done in MicroStation in accordance with *UDOT CADD Standards*.

Develop DTM of the Existing Surface

All work should be done in InRoads and MicroStation in accordance with *UDOT CADD Standards*.

Potential Contacts

Agency	Information Requested
Federal Agencies/Bureau of Land Management/Forest Service/National Park Service/Bureau of Reclamation/U.S. Geological Survey/Department of Defense/Bureau of Indian Affairs	Permission to Enter Survey Markers
UDOT Permits Officer	Access Permit
UDOT Region ROW Engineer	Survey Control
Local Governments	Permission to Enter Survey Control
State Land Board	Permission to Enter
School and Institutional Trust Land Administration (SITLA)	Permission to Enter
Indian Nations	Permission to Enter
Railroads	Permission to Enter
Private Property Owners	Permission to Enter

Complete Base Mapping File Certification

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Licensed Land Surveyor with the Certification
- Upload the Certification onto ProjectWise when completed, sealed, and signed

4B1 Conduct Supplemental Surveys

(back to table)

Overview

Coordinate with the project team to identify additional survey requirements.

References

- ☐ UDOT Mapping and Aerial Photogrammetry Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ Revised Survey Control Sheets
- ☐ Additional Base Mapping
- ☐ Base Mapping File Certification

Distribution

- ☐ ProjectWise
- ☐ Design Leader

Deliverable	Task	Responsible Party	
		Activity Leader	
		Surveyor	Survey CADD Technician
Revise Survey Control Sheet	▪ Revise Survey Control (if necessary)	X	
	▪ Revise Survey Control Sheets	X	
Additional Base Mapping	▪ Determine Extent of Additional Surveying Needs		X
	▪ Develop Additional Base Mapping and DTM		X
Base Mapping File Certification	▪ Complete Base Mapping File Certification	X	

Revise Survey Control (if necessary)

If necessary, revise the survey control following instructions from 1B1.

Revise Survey Control Plan Sheets (if needed)

If necessary, revise the survey control sheets following instructions from 1B1.

Determine Extent of Additional Surveying Needs

Coordinate with project team members to determine additional surveying needs.

Develop Additional Base Mapping and DTM

As needed, revise or provide additional base mapping and DTM following instructions from 1B1.

Complete Base Mapping File Certification

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Licensed Land Surveyor with the Certification
- Upload the Certification onto ProjectWise when completed, sealed, and signed

This page intentionally left blank

1C1 Assess ITS (ATMS) Needs

(back to table)

Overview

Review the existing conditions, ITS Strategic Plan, and project objectives to develop recommendations to meet ITS needs.

References

- ☐ Project ITS Scoping Summary Form
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Project ITS Scoping Summary

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Project Manager

Deliverable	Task	Responsible Party Activity Leader Region ITS Project Manager
Project ITS Scoping Summary	▪ Complete Project ITS Scoping Summary	X
	▪ Provide ITS Summary to Design Leader	X
	▪ Estimate ITS Improvements Cost	X
	▪ Initiate QC Review	X

Complete ITS Project Needs Summary

If it exists, review the state ITS strategic plan to determine what components are needed in the project area. Coordinate with the ITS groups and ITS Program Manager to determine the project scoping and complete the Project ITS Scoping Summary.

- Locate all existing ITS elements in the general vicinity of the project. Generate a location map with the elements mapped.
- Coordinate project needs, future needs, and recommendations for the following ITS elements with all interested groups:
  - CCTV
    - Control Room Manager
    - Signal Timing Engineer

        - Traffic Operations Engineer
    - Variable Message Signs (VMS)
        - Control Room Manager
        - Traffic Operations Engineer
    - Traffic Monitoring Stations (TMS)
        - Traffic Mobility Engineer
        - Traffic Operations Engineer
        - Signal Timing Engineer
        - Systems Planning and Programming
    - Traffic Signal Interconnect
        - Signal Timing
        - Traffic Operations Engineer
    - Ramp Meters
        - Traffic Mobility Engineer
        - Signal Timing Engineer
        - Traffic Operations Engineer
    - Remote Weather Information System (RWIS)
        - Meteorologist
    - Highway Advisory Radio (HAR)
        - Control Room Manager
        - Traffic Operations Engineer
        - ITS Deployment Engineer
    - Fiber Optics and Communications
        - Fiber Optics Business Manager
- Prioritize the recommended improvements in the final recommendation summary
- Include the estimated cost for all recommended improvements.

Estimate ITS Improvements Cost

Estimate the costs of proposed ITS improvements.

Initiate QC Review

Review the Project ITS Scoping Summary with a QC Checker to verify the findings, assumptions, plan, costs, and schedule.

3C1 Develop ITS (ATMS) Components Design

(back to table)

Overview

Identify the ITS device locations and prepare a preliminary ITS cost estimate.

References

- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT CADD Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary ITS (AT) Plan Sheets
- ☐ ITS Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Region ITS Project Manager

Deliverable	Task	Responsible Party Activity Leader ITS Designer
Preliminary ITS (AT) Plan Sheets	▪ Identify Locations of Device Placement	X
	▪ Review Signal Design for Interconnect Needs	X
	▪ Prepare Preliminary AT Plan Sheets	X
ITS Cost Estimate	▪ Develop ITS Cost Estimate	X
QC Cover Sheets	▪ Initiate QC Review	X

Identify Locations of Device Placement

Identify all ITS device locations and connections. Coordinate with the Region ITS Manager to meet all TMD requirements.

- Possible elements to include in this summary include the following:
  - *Fiber Optic - Conduit or New Network Infrastructure*
    - Coordinate with the TMD Fiber Business Manager.

        - Identify connection locations
        - Identify size and number of ducts
        - Identify strand count
    - *Traffic Signal Interconnect*
        - Coordinate with the Signal Maintenance Supervisor or the Signal Operations Engineer.
        - Identify each device as wireless or fiber optic
    - *CCTV Camera*
        - For Signal Operations, coordinate with the Signal Operations Engineer.
        - For Freeway Operations, coordinate with the Control Room Manager.
        - Determine height and verify line of sight
        - Locate all CCTV's outside of curve
        - Identify static and lowering poles
        - Place a CCTV to read each VMS message
    - *RWIS*
        - Coordinate with the Traffic Operations Center (TOC) Meteorologist.
    - *HAR*
        - Coordinate with the ITS Deployment Engineer.
        - Evaluate overhead and structural interference
        - Coordinate with the TMD Traffic Operations Engineer for device integration into the system
        - Obtain vendor device specifications to verify chosen device is appropriate
    - *VMS*
        - Coordinate with the Control Room Manager.
        - Locate at adequate distances from decision points
        - Meet sight distance requirements
        - Identify the type of VMS for each location
        - Number of pixels, character height, and number of lines
        - LED viewing cone
        - Identify structure type for each sign
        - Place ATMS cabinet in view of the VMS message
        - Verify each VMS message is visible by a CCTV
    - *Ramp Metering*
        - Coordinate with the Signal Maintenance Supervisor and the Signal Operations Engineer.
        - Evaluate vehicle storage length and number of lanes for each location
        - Evaluate acceleration lanes for each location
    - *TMS Stations*
        - Coordinate with the Traffic Mobility Engineer.
        - Coordinate with Systems Planning and Programming to consolidation/supplement the ATR system with the TMS system
- Locate all facilities within the proposed ROW
    - If necessary, coordinate additional ROW with the ROW design team

    - Coordinate all necessary easements, including aerial and temporary easements, with the ROW design team
- Locate all facilities outside the clear zone or use adequate protective measures
- Identify access points for maintenance
- Identify potential environmental conflicts
- Locate the power source
    - Coordinate and receive approval from Power Company for connection
- Identify potential utility conflicts
    - Place each device to minimize conflicts
    - Coordinate with utility team
- Identify communication access
    - Identify each device as wireless or hard wire
    - Identify connection locations
    - Coordinate and receive approval from the Communications Company
- Coordinate and receive approval from the TMD Fiber Optics Business Manager

Review Signal Design for Interconnect Needs

- Review the device locations and needs

Prepare Preliminary ITS (AT) Plan Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to develop preliminary plan sheets for review. These sheets are to provide a review of the proposed locations of all ITS (ATMS) devices. It is recommend that only the information required for review be placed on the sheets at this time. Verify with the project manager the expected level of effort for the review submittal. All information on the sheets must go through the QC review procedure before distribution. Combine plan sheets with other designs when appropriate.

- Conform to General Plan Sheet Requirements of the UDOT Plan Sheet Development Standards
- Follow and maintain CADD standards on each sheet.
- Include all information necessary for review (callouts, notes, etc.)

Develop ITS Cost Estimate

- Compile ITS bid items and quantities
    - Use UDOT standard bid items
- Develop unit costs for each item
    - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.)
    - Document unit cost development, assumptions, etc.
    - Account for project specific factors (see below)
- Use lump sum pricing only when appropriate
    - Consider contractor risk due to unknown quantity
    - Consider difficulty in pricing per unit
    - Consider all materials and labor involved

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Specialty equipment	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Time of year of advertising	Constructability

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide Checker with check prints of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

4C1 Complete ITS (ATMS) Plans and Documents

(back to table)

Overview

Complete the ITS plans and project documents and finalize the ITS (ATMS) cost estimates.

References

- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Standard and Supplemental Specifications
- ☐ UDOT Design of Signalized Intersections: Guideline and Checklist
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ Specification Writer's Guide
- ☐ Measurement and Payment Template
- ☐ Acceptance and Documentation Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ ITS Comment Resolutions
- ☐ ITS (AT) Plan Sheets
- ☐ ITS Project Documents
- ☐ ITS Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ Design Leader
- ☐ ProjectWise

Deliverable	Task	Responsible Party	
		Activity Leader	
		ITS Project Manager	ITS Designer
ITS Comment Resolutions	▪ Address Review Comments		X
ITS (AT) Plan Sheets	▪ Revise ITS (ATMS) Design		X
	▪ Complete ITS Plan Sheets		X
	▪ Complete ITS Details		X
	▪ Complete ITS Summary Sheets		X
ITS Cost Estimate	▪ Finalize ITS Cost Estimate		X
	▪ Enter ITS Estimate into PDBS		X
ITS Project Documents	▪ Prepare ITS Project Documents		X
QC Cover Sheets	▪ Initiate QC Review		X

Address Review Comments

Address all ITS (ATMS) related comments. See *UDOT QC/QA Procedures* for more information about completing comment resolutions.

Revise ITS (ATMS) Design

Complete all ITS designs.

- Conform to UDOT CADD Standards and UDOT Standard and Supplemental Drawings
- Connect all devices with conduit
- Complete the electrical layout from the power supply
- Locate all facilities within the proposed ROW
- Locate all facilities outside the clear zone or provide adequate protection
- Locate all facilities outside the snow plow zone or provide adequate protection
- Provide maintenance access point for all devices
- Obtain device manufacture's specifications and stay within device performance limits
- Maintain line of sight for all wireless devices
- Coordinate the following designs with appropriate managers to meet operations criteria
    - ATMS
        - Determine all pole heights
        - Determine all cabinet types and locations
    - Traffic Management System
        - Select a TMS appropriate to meet operations criteria
            - Pavement Imbedded Wireless Detector
            - Place radar to accurately read all lines
            - Place loop groups in accordance with UDOT standards

- VMS
  - Place over correct lanes
  - Coordinate the structure with the Structures Team
  - Meet driver visibility requirements
    - LED viewing cone
    - Sign alignment
  - Verify static signs do not block the CCTV view
  - Coordinate placement with static signs to avoid conflicts
- RWIS
- Signal Interconnect
  - Determine all box types and locations
  - Determine all cabinet sizes and locations
- Ramp Meters
- Fiber Optic
  - Coordinate with the Fiber Business Manager to determine the stand counts and conduit sizes
  - Determine all splice locations
  - Determine all box types
  - Obtain approval from Fiber Business Manager of all splice locations

Complete ITS Plan Sheets

Complete all ITS (ATMS) plan sheets in accordance with UDOT and Federal standards.

- Conform to *UDOT Plan Sheet Development Standards*
  - General plan sheet requirements
- Maintain *UDOT CADD Standards* on each sheet (i.e. line styles shown correctly, cell scaling, etc.)
- Identify all existing ITS facilities
  - Call out ITS devices that will remain as "Keep in Service"
  - Coordinate with the TMD all disconnections and clearly state the requirements
- Show cut/fill lines for mainline, ramps, and any side streets
- Include all necessary notes, callouts, legends, etc.
  - Call out splice points
  - Provide general location of ITS devices
  - Optimize the location of the CCTV camera
  - Include street names on the mainline and cross streets
  - Show the electrical layout from the power supply to the power disconnect
- Show the communications layout from demarcation to the ITS device
  - Include note to contact the Fiber Business Manager to obtain splicing details 30 days prior to beginning splice work
- Identify and reference standard drawings and details correctly.
- Clearly organize all information
- Make all symbols and line styles identifiable.
- Match pay item callouts exactly with the cost estimate.
- Indicate all utility conflicts on both the plan and profile.

Complete ITS Details

- Complete all details necessary for construction of the project
  - Conform to *UDOT CADD Standards*
- Prepare detail plan sheets following *UDOT Plan Sheet Development Standards*
  - General Plan Sheet Requirements
  - Detail Sheet Requirements
  - Include all necessary notes, callouts, dimensions, symbols, etc.
  - Use identifiable symbols and line styles

Complete ITS Summary Sheets

- Prepare summary sheets in accordance with *UDOT Plan Sheet Development Standards* and *Summary Sheet CADD Standards*
  - General Plan Sheet Requirements (Department or Region)
  - Summary Sheet Requirements
- Use UDOT Excel spreadsheets and customize for the project
  - Include all roadway related pay items and necessary non-pay items
  - Include names, alignment designations, stations, offsets, units, and quantities
  - Show enough detail to support calculations
- Use UDOT standard summary plan sheets
  - Export all summaries from Excel to Microstation

Finalize ITS Cost Estimate

- Update the form provided by ITS Deployment Section
- Update ITS bid items and quantities
- Update ITS unit costs (see 3C1)

Enter ITS Estimate into PDBS

Prepare ITS Project Documents

- Provide all special provisions required for project construction
  - General Special Provisions
  - Project Specific Special Provisions
  - Use *Specification Writer's Guide*
- Use PDBS to generate M&P for all bid items
  - Develop M&P for all non-standard bid items
  - Use the current *Measurement and Payment Template*
  - Include accurate description for all effort and materials required for construction.
  - M&P pay items must match plan sheet pay items exactly
- Use PDBS to generate A&D for all standard pay items
  - Use the *Acceptance and Documentation Guide*
  - Coordinate with the RE to develop A&D for non-standard items

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide Checker with check prints of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

This page intentionally left blank

1E1 Review Project Environmental Commitments (EA/EIS

(back to table)

Overview

For EA/EIS projects, review environmental commitments on the ePM Screen 775.

References

- ☐ ePM Screen 775
- ☐ EA/EIS Report
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Project Commitment Report
- ☐ QC Cover Sheet

Distribution

- ☐ ProjectWise
- ☐ Project Manager

Deliverable	Task	Responsible Party Activity Leader Region Environmental Manager
Project Commitment Report	▪ Review Commitments and Populate or Update Project Commitments Database	X
	▪ Prepare Project Commitments Report	X
QC Cover Sheet	▪ Initiate QC Review	X

Review Commitments and Populate or Update Project Commitments Database

- Review project commitments in ePM Screen 775.
- Read the EA/EIS and the approval document (FONSI/ROD) to glean all commitments made.
- Enter the commitments as necessary into the project commitments database.

Prepare Project Commitments Report

- Print the report from ePM Screen 775.

- Highlight the critical commitments that have a potential to affect the scope, schedule, or budget of the project.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

2E1 Analyze Environmental Resources

(back to table)

Overview

Provide environmental resource locations to the roadway designers for consideration during design.

References

- ☐ UDOT Environmental Process Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Environmental Resource Locations
- ☐ QC Cover Sheet

Distribution

- ☐ ProjectWise
- ☐ Project Manager

Deliverable	Task	Responsible Party Activity Leader Region Environmental Manager
Environmental Resource Locations	▪ Perform Resource Impact Analysis	X
	▪ Provide Environmental Resource Information	X
QC Cover Sheet	▪ Initiate QC Review	X

Prepare Resource Impact Analysis

Prepare technical documentation for each environmental resource potentially impacted. Results may include the identification of potential impacts, potential mitigation, and necessary permits. Refer to the *Environmental Process Manual of Instruction* for further information.

Provide Environmental Resource Information

Provide information about the environmental resource locations to the designers for inclusion in the roadway design file.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

3E1 Write Categorical Exclusion Document and Obtain Approval

(back to table)

Overview

Complete and obtain approval of the categorical exclusion for the project.

References

- ☐ UDOT Environmental Web Page
- ☐ CE Delegation Page
- ☐ UDOT Environmental Process Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide
- ☐ ePM Screen 770

Deliverables

- ☐ Approved Categorical Exclusion
- ☐ QC Cover Sheet

Distribution

- ☐ Region Environmental Lead
- ☐ Central Environmental
- ☐ ProjectWise
- ☐ FHWA

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Environmental Lead	Central Environmental
Approved Categorical Exclusion	▪ Coordinate with Agencies	X	
	▪ Perform Additional Studies	X	
	▪ Determine Need for Public Hearing	X	
	▪ Perform Resource Impact Analysis	X	
	▪ Provide Environmental Resource Information	X	
	▪ Complete Categorical Exclusion Form in ePM	X	
	▪ Submit Draft Categorical Exclusion for Review and Approval	X	
QC Cover Sheet	▪ Initiate QC Review	X	

Coordinate with Agencies

Coordinate with agencies regarding potentially impacted resources. Refer to the *Environmental Process Manual of Instruction*.

Perform Additional Studies

Perform additional studies as identified through resource research and agency coordination.

Determine Need for Public Hearing

Based on resource impacts and agency coordination, determine if a public hearing or an opportunity for a public hearing is necessary. Coordinate with Region Public Involvement Manager. The following impacts may deem a public hearing necessary:

- Additional through travel lanes
- Substantially changed layout or function of the facility
- Adverse impacts

Perform Resource Impact Analysis

Prepare technical documentation for each environmental resource potentially impacted; the information will be necessary to complete the environmental document. The results could include the identification of potential impacts, potential mitigation, and necessary permits. Refer to the *Environmental Process Manual of Instruction* for further information.

Provide Environmental Resource Information

Provide information about the environmental resource locations to the designers.

Complete Categorical Exclusion Form in ePM

Complete the environmental document form in ePM and attach all necessary documentation. See the *Environmental Process Manual of Instruction* for more information. Ensure all applicable ePM sections are completed and include the following information:

- Title/Signature
  - Properly categorize the project.
  - Appropriate (c) or (d) list descriptions.
  - The reviewer cannot be the preparer.
- Purpose & Need
  - Clearly describe the transportation problems and deficiencies in the project area.
    - Congestion
    - Safety
    - Traffic
    - Unsafe geometries
    - Lack of trail facilities
    - Etc.
  - Clearly and concisely describe the need for the project.

- Do not discuss solutions.

- Description
  - Clearly describe the proposed actions of the project.
    - Address identified needs.
  - Detail the length and location of the project.
    - Include mile posts.
    - Include route.
    - Include width, length, and depth of excavation (if applicable).
  - Include all reference maps, typical sections, etc. in Appendix or as an attachment.
- Public Involvement
  - Summarize and address all public hearing comments.
  - Include comments in an appendix.
  - Include a copy of the public hearing transcript and certification.
- Right-of-Way
  - Summarize all ROW impacts.
    - Include number of parcels.
    - Include number of acres.
- Cultural
  - Include all appropriate clearance letters in an appendix.
    - Region Archaeologist.
    - SHPO
    - THPO
    - Native American consultation letters
  - Include signed MOA (if applicable).
  - Include all mitigation measures in the project commitments.
- Paleontological
  - Attach UDOT Region Archaeologist clearance letter.
  - Attach appropriate UGS letter (if applicable).
  - Include all mitigation measures in the project commitments.
- T&E Species
  - Include UDOT Wildlife Biologist clearance memo if the project has no affect on threatened or endangered species.
  - Include USF&WS written clearance if an Endangered Species Act Section 7 is required.
  - Include all mitigation measures in the project commitments.
- Wildlife
  - Attach UDOT Wildlife Biologist memo.
  - Include all mitigation measures in the project commitments.
- Noise
  - Attach noise study for Type I projects.
  - Verify noise study follows the latest policy.
  - Include all mitigation measures in the project commitments.
- Wetlands, Water
  - Attach Region or Central Landscape Architect memo or Army Corps of Engineers letter if project is not specified on ePM 770.

    - Include all mitigation measures in the project commitments.
- Air Quality
    - The following are conditions when air quality is to be considered:
        - CO or PM10 maintenance
        - Non-attainment county project that adds or alters roadway capacity
        - Project results in increase traffic volumes
    - If the project meets one of the conditions above, complete the following:
        - Air quality supplement
        - Applicable CO or PM10 analysis
- Relocations
    - List the number and addresses of all relocations in the comment box.
- Section 4(f)
    - Complete the following for *de minimis* and not historical impacts:
        - Post a public notice and allow opportunity to view the notice.
        - Summarize and respond to comments from the public
        - Attach comments and responses.
        - Obtain and attach jurisdiction official concurrence letter.
        - Obtain concurrence from FHWA for CE3 and if *de minimus* is for parks and recreation of wildlife refuge.
    - Attach Individual or Programmatic 4(f) evaluation if conducted.
    - Attach UDOT Environmental Services (or FHWA for CE3) approval of the Individual or Programmatic 4(f) evaluation (if applicable).
- Mitigation Commitments
    - Describe all applicable mitigation commitments.
    - Receive approval from the Region Environmental Manager, Region Project Manager, or District Engineer for all mitigation commitments.
    - Assign all commitments to an individual to ensure implementation.
    - Compile list of all necessary permits.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

Submit Categorical Exclusion for Review and Approval

Submit the completed Categorical Exclusion for review. As necessary, incorporate comments based on reviews from the region environmental staff and resubmit. Obtain an approved Categorical Exclusion.

3E2 Conduct Public Hearing (CATX)

(back to table)

Overview

Conduct the public hearing to provide the public with an opportunity to comment on the categorical exclusion document.

References

- ☐ UDOT Public Meeting Calendar
- ☐ UDOT Public Involvement Plan
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ Advertisement and/or Legal Notice for Opportunity for Public Hearing
- ☐ Meeting Materials and Displays
- ☐ Summary of Comments
- ☐ Project Document Cover Sheets (QC)

Distribution

- ☐ Region PIM
- ☐ ProjectWise
- ☐ Project Environmental Lead

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Environmental Lead	Project PIM
Advertisement/Legal Notice for Opportunity for Public Hearing	▪ Determine Whether to Hold Public Hearing	X	
	▪ Advertise for Public Hearing		X
Meeting Materials and Displays	▪ Prepare for Hearing		X
	▪ Hold Public Hearing		X
Summary of Comments	▪ Prepare Summary of Comments		X
Project Document Cover Sheets	▪ Initiate QC Review		X

Determine Whether to Hold Public Hearing

Coordinate with the Project Environmental Lead to determine if a public hearing is necessary.

Advertise for Public Hearing

Determine the method(s) of advertisement and include all necessary information.

- Contact information
- Date, Location, and time
- Current logos and graphics
- Indicate ADA compliance
- Meet all current UDOT regulations

Prepare for Hearing

- Determine the location of the hearing.
- Provide 30 days notice for invitation and place legal notice in the newspaper
- Provide a court recorder for comments.
- Provide notice of a 30 day comment period.
- Make the environmental document available at public places for 30 days of public review.
- Coordinate with leadership and design team to make sure messages are consistent.
- Develop meeting materials and displays.
    - Use most current design.
    - Be consistent with material messages and graphics.

Hold Public Hearing

Prepare Summary of Comments

Compile and address all comments.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

4E1 Prepare/Submit Permits

(back to table)

Overview

Based on the impacts identified in the categorical exclusion, prepare and obtain permits necessary for the project.

References

- ☐ UDOT Environmental Web Page
- ☐ UDOT Environmental Process Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ Approved Permit(s)
- ☐ QC Cover Sheet

Distribution

- ☐ ProjectWise
- ☐ ePM Screen 775
- ☐ Project Manager

Deliverable	Task	Responsible Party Activity Leader Project Environmental Lead
Approved Permit(s)	▪ Prepare and Submit Permit(s)	X
	▪ Document in Project Commitment Database	X
QC Cover Sheet	▪ Initiate QC Review	X

Prepare and Submit Permit(s)

Prepare permit(s) and submit to resource agencies as required.

Document in Project Commitment Database

Approved permit(s), including all required mitigation, should be included in the project commitment database (ePM Screen 775).

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

5E1 Obtain Environmental Permits

(back to table)

Overview

Obtain all environmental permits necessary for construction to begin

References

- ☐ UDOT Environmental Web Page
- ☐ UDOT Environmental Process Manual of Instruction

Deliverables

- ☐ Signed Permit(s)

Distribution

- ☐ ProjectWise
- ☐ ePM Screen 775
- ☐ Project Manager

Deliverable	Task	Responsible Party Activity Leader Project Environmental Lead
Signed Permit(s)	▪ Coordinate with Jurisdictions	X

Coordinate with Jurisdictions

Coordinate with the various jurisdictions requiring permits to obtain signed permits.

This page intentionally left blank

1G1 Conduct Preliminary Geotechnical Investigation

(back to table)

Overview

Identify potential issues that may affect the design and construction of the project. Identify preliminary mitigations and develop a plan to select and design appropriate mitigations.

References

- ☐ UDOT Geotechnical Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary Geotechnical Investigation
- ☐ Preliminary Work Plan (Scope)

Distribution

- ☐ ProjectWise
- ☐ Design Leader

Deliverables	Task	Responsible Party Activity Leader Geotechnical Design Engineer
Preliminary Geotechnical Investigation	▪ Conduct Preliminary Geotechnical Investigation	X
	▪ Develop Potential Mitigation Strategies	X
Preliminary Work Plan (Scope)	▪ Develop Geotechnical Work Plan	X
	▪ Initiate QC Review	X

Conduct Preliminary Geotechnical Investigation

Locate any information about the project area that could include, but is not limited to, the following:

- Previous Geotechnical/Geological Investigations/Reports
- Previous Construction Plans/As-Builts
- Construction Monitoring Data
- Research Reports
- Geologic Mapping
- Landslide/Rock fall evaluations and studies
- Seismic Studies (including site specific analysis)

- Determine preliminary liquefaction/lateral spread potential
- Conduct field visit and identify issues that may impact or affect the project design, construction, and performance.
    - Coordinate with maintenance to discuss maintenance history and existing conditions
    - Site accessibility and potential traffic problems
    - Topography
    - Potential geotechnical subsurface investigation utility conflicts
    - Surface water
    - Erosion patterns
    - Geologic structure and soil/rock profiles
    - Additional surface features
    - Information regarding the soil and bedrock
    - Landslide/Rockfall potential

Develop Potential Mitigation Strategies

- Develop a preliminary strategy to mitigate identified issues
- Develop preliminary costs to implement mitigations

Develop Geotechnical Work Plan (Scope)

Develop a geotechnical work plan (scope) for obtaining the necessary information and completing the geotechnical design. Include the following items as part of the work plan:

- A brief summary of the preliminary geotechnical findings and assumptions.
- Identify the information needed to verify assumptions and complete the geotechnical design.
- Develop a plan, cost, and schedule to obtain the information needed to conduct the geotechnical investigation
- Develop a plan, cost, and schedule to complete the geotechnical design

Initiate QC Review

Review the Geotechnical Work Plan with a QC Checker to verify the findings, assumptions, plan, costs, and schedule.

3G1 Conduct Geotechnical Investigation

(back to table)

Overview

Conduct subsurface exploration for all cuts, fills, retaining walls, drainage, and structural designs. Coordinate with the design engineers to identify the locations of the subsurface exploration. Refer to the *UDOT Geotechnical Manual of Instruction* for guidance.

References

- ☐ UDOT Geotechnical Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Subsurface Exploration Plan
- ☐ Field Subsurface Exploration Logs
- ☐ Submit Samples for Testing
- ☐ Subsurface Exploration Location Sketch
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Geotechnical Design Engineer
- ☐ UDOT Geotechnical Oversight Engineer
- ☐ 3G2, 4G1

Deliverable	Task	Responsible Party	
		Activity Leader	
		Geotechnical Design Engineer	Drilling Geologist
Subsurface Exploration Plan	▪ Conduct Field Review	X	
	▪ Determine Access and Layout of Subsurface Explorations	X	
	▪ Develop a Traffic Control Plan for Subsurface Exploration		X
	▪ Obtain Clearances and Permits for Subsurface Exploration		X
	▪ Submit Exploration Plan to UDOT Geotechnical Oversight Engineer	X	
Submit Samples for Testing	▪ Subsurface Exploration and Sampling		X
	▪ Prepare Field Subsurface Exploration Logs		X
	▪ Sort and Submit Samples for Laboratory Testing		X
Subsurface Exploration Location Sketch	▪ Request Survey for Subsurface Exploration Locations	X	X
	▪ Prepare Subsurface Exploration Location Sketch	X	X
QC Cover Sheets	▪ Initiate QC Review	X	X

Conduct Field Review

Evaluate site conditions for subsurface exploration.

Determine Access and Layout of Subsurface Exploration

Coordinate with appropriate designers to do the following:

- Obtain/evaluate cut and fill slopes and cross-sections.
- Obtain structure foundation locations and sizes.
- Establish a conceptual settlement or slope stability mitigation plan.
- Establish a subsurface exploration and soil testing plan for settlement, slope stability, liquefaction/lateral spread investigation, foundation, and retaining wall design.
- Establish a field reconnaissance plan (include exposed rock mapping if required).
- Obtain a map of environmental resources/potential environmentally sensitive sites.

Develop a Traffic Control Plan for Subsurface Exploration

Coordinate with the roadway designer to develop a traffic control plan as necessary.

Obtain Clearances and Permits for Subsurface Exploration

Potential Contacts

Agency	Information Requested
Bureau of Land Management/Forest Service/National Park Service	Cultural Considerations Material Sites Recreational Areas Permission to Enter
Natural Resources Conservation Service	Soil Characteristics
State Land Board	Cultural Considerations Material Sites Recreational Areas Permission to Enter
Utah Division of Natural Resources	Old Mine Sites Drill Sites
Indian Nations	Cultural Considerations Material Sites Recreational Areas Permission to Enter
Utilities	Buried Utilities (Blue Stake) and Local Municipalities (not covered by Blue Stake)
Railroads	Permission to Enter and Coordination/Required Training
Private Property Owners	Permission to Enter and Coordination
Division of Wildlife Resources/State Engineer's Office/U.S. Army Corps of Engineers/U.S. Bureau of Reclamation/U.S. Fish and Wildlife Service	Permission to Access Potential Environmentally Sensitive Areas

Submit Exploration Plan for Review to UDOT Geotechnical Oversight Engineer

Submit the exploration plan to the UDOT Geotechnical Oversight Engineer prior to performing subsurface exploration. Include the following items:

- Proposed subsurface exploration location map
  - Identify all proposed exploration locations (station, offset, and elevation)
- Purpose for each exploration location
- Estimated depths of purposed exploration
- Traffic Control Plan
- Justification for deviations from the Geotechnical Manual of Instruction

Subsurface Exploration and Sampling

Conduct the subsurface explorations and soil sampling necessary to provide proper geotechnical design recommendations for settlement, slope stability, liquefaction/lateral spread investigation, foundation, and retaining wall design.

Prepare Field Subsurface Exploration Logs

Prepare Subsurface Exploration Location Sketch

Sort and Submit Samples for Laboratory Testing

Request Survey for Subsurface Exploration Locations (Horizontal Coordinates and Elevations)

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with the following:
  - Subsurface Exploration Plan
  - Field Subsurface Exploration Logs
  - Subsurface Exploration Location Sketch
- Provide the Checker with the appropriate cover sheet.
- Complete revisions based on comments by Checker and Back Checker.

3G2 Conduct Geotechnical Testing

(back to table)

Overview

Conduct laboratory soil testing and prepare the soil test summary.

References

- ☐ UDOT Geotechnical Manual of Instruction (G-MOI)
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Individual Soil Test Results
- ☐ Soil Test Summary
- ☐ QC Cover Sheet

Distribution

- ☐ ProjectWise
- ☐ Geotechnical Design Engineer
- ☐ 4G1

Deliverable	Task	Responsible Party		
		Activity Leader		
		Geotechnical Lab Technician	Geotechnical Lab Manager	Geotechnical Design Engineer
Individual Soil Testing Results	▪ Develop Testing Program			X
	▪ Prepare Soil Testing Samples	X		
	▪ Conduct Laboratory Tests	X		
	▪ Prepare Individual Soil Testing Results	X		
Soil Test Summary	▪ Prepare Soil Testing Summary	X		
QC Cover Sheet	▪ Initiate QC Review	X	X	

Develop Testing Program

Identify tests necessary for design analysis in accordance with the G-MOI and AASHTO/AMRL standards.

Prepare Samples

Prepare the necessary samples for AASHTO testing procedures for each testing program.

Conduct Laboratory Tests

Conduct laboratory soil testing to aid in settlement, slope stability, liquefaction/lateral spread investigation, foundation, and retaining wall design.

Prepare Individual Soil Testing Results

- Prepare charts and graphs (as necessary) showing results of individual tests.
- Note any irregularities or compromised samples.

Prepare Soil Test Summary

Prepare a summary of test data. Include the following information:

- Summary table containing results
- Note any irregularities or compromised samples

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide individual soil tests and soil test summary to the Geotechnical Laboratory Manager for review.
- Provide the Checker with the appropriate cover sheet.
- Complete revisions based on comments by Checker and Back Checker.
- Upload Laboratory QC/QA and QSM documentation onto ProjectWise.

3G3 Complete Foundation Type Memo

(back to table)

Overview

Complete structure foundation type memo for the structure design engineer.

References

- ☐ UDOT Geotechnical Manual of Instruction (G-MOI)
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Structure Foundation Type Memo

Distribution

- ☐ Chief Geotechnical Engineer
- ☐ Structures Design Engineer
- ☐ ProjectWise

Deliverable	Task	Responsible Party	
		Activity Leader	
		Geotechnical Design Engineer	Chief Geotechnical Engineer
Foundation Type Memo	▪ Conduct Structure Foundations Selection	X	
	▪ Develop Recommendations	X	
	▪ Submit Structure Foundation Type Memo	X	
QC Cover Sheets	▪ Initiate QC Review	X	X

Conduct Structure Foundations Selection

Assess economic structure foundation alternatives.

Develop Recommendations

Develop preliminary structure foundation type recommendations.

Submit Structure Foundation Type Memo

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with the structure foundation type memo.
- Provide the Checker with the project document cover sheet.
- Complete revisions based on comments by Checker and Back Checker.

4G1 Complete Geotechnical Design and Draft Report

(back to table)

Overview

Perform the geotechnical design for settlement, slope stability, liquefaction/lateral spread investigation, foundation, and retaining wall design and develop the draft geotechnical report for peer review.

References

- ☐ UDOT Geotechnical Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Geotechnical Design
- ☐ Draft Geotechnical Report
- ☐ QC Cover Sheets
- ☐ Independent Report Review Cover Sheet

Distribution

- ☐ Chief Geotechnical Engineer
- ☐ Structure Design Engineer
- ☐ Peer Review Committee
- ☐ ProjectWise

Deliverable	Task	Responsible Party Activity Leader Geotechnical Design Engineer
Geotechnical Design	▪ Prepare Subsurface Exploration Logs for Soil Data Sheets	X
	▪ Conduct Geotechnical Analyses	X
	▪ Develop Recommendations	X
Draft Geotechnical Report	▪ Prepare Draft Report	X
QC Cover Sheets	▪ Initiate QC Review	X
Independent Report Review Cover Sheet	▪ Distribute for Peer Review	X

Prepare Subsurface Exploration Logs for Soil Data Sheets

Prepare geotechnical subsurface exploration logs in accordance with the Geotechnical Manual of Instruction. Generate the logs in a graphical format that is compatible with Microstation. Provide the Microstation compatible draft logs to the structure draftsman for inclusion in structure plans.

Conduct Geotechnical Analyses

Conduct geotechnical analysis in accordance with the Geotechnical Manual of Instruction. Perform the geotechnical design for settlement, slope stability, liquefaction/lateral spread investigation, foundation, and retaining wall design. Develop an instrumentation plan for construction and long-term monitoring.

Develop Recommendations

Develop foundation and earthwork recommendations. Provide preliminary recommendations to the roadway and structure design engineers as required.

Prepare Draft Report

Prepare the draft the report and include recommendations, design parameters, and data in accordance with the Geotechnical Manual of Instruction.

- Include preliminary project documents in the draft report (see 4G2)
  - Draft soil data sheets
  - Draft special provisions
  - Draft geotechnical detail plan sheets

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide a check print of the deliverables to the Checker.
  - Data sheets
  - Calculations
  - Computer program input print outs
  - Draft report
- Provide the Checker with the appropriate cover sheets.
- Complete revisions based on comments by Checker and Back Checker.

Distribute for Peer Review

Provide the draft report to the Chief Geotechnical Engineer, Structures Design Engineer, and peer review committee for review. Provide an Independent Technical Review Cover Sheet to be circulated with the draft report.

4G2 Develop Geotechnical Project Documents

(back to table)

Overview

Develop geotechnical plan sheets, special provisions, and other documents required for the advertisement of the project.

References

- ☐ UDOT Geotechnical Manual of Instruction
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Standard and Supplemental Specifications
- ☐ UDOT Plan Sheet Development Standards
- ☐ Specification Writer's Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Geotechnical Soil Data Plan Sheets
- ☐ Geotechnical Special Provisions
- ☐ Geotechnical Detail Plan Sheets
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Structure Design Engineer
- ☐ Roadway Designer

Deliverable	Task	Responsible Party Activity Leader Geotechnical Design Engineer
Geotechnical Soil Data Plan Sheets	▪ Complete Geotechnical Soil Data Plan Sheets	X
Geotechnical Special Provisions	▪ Prepare Geotechnical Special Provisions	X
Geotechnical Detail Plan Sheets	▪ Prepare Geotechnical Details for Plan Sheets	X
QC Cover Sheets	▪ Initiate QC Review	X

Prepare Geotechnical Soil Data Plan Sheets

Provide the structures design engineer with the final logs and locations for inclusion in the soil data plan sheets. Coordinate with the structures design engineer (or drafter) to complete the soil data plan sheets. Sign and seal the soil data plan sheets after the QC procedure is completed.

Prepare Geotechnical Special Provisions

Provide all necessary special provisions and revisions to specifications required for project construction. Follow the *Specification Writer's Guide* to complete all necessary specifications.

Prepare Geotechnical Details For Plan Sheets

If necessary, prepare geotechnical details to be included in plan sheets. Coordinate with the structure design engineer (or drafter) and/or the roadway designer. Plan sheets follow the *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards*.

- General Plan Sheet Requirements
- Detail Sheet Requirements
- Include all necessary notes, callouts, dimensions, symbols, etc.
- Make sure all symbols and line styles are identifiable.
- Sign and seal plan sheets.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide a check print of the deliverable to the Checker.
  - Soil data plan sheets with location maps
  - Geotechnical special provisions and specification revisions
  - Geotechnical detail plan sheets
  - Calculation and computer input printouts (if applicable)
- Provide the Checker with the appropriate cover sheet.
- Complete revisions based on peer review comments (4G1) and on comments by the Checker and Back Checker.

4G3 Finalize Geotechnical Report

(back to table)

Overview

Conduct peer review, incorporate review comments and produce the final geotechnical report.

References

- ☐ UDOT Geotechnical Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Geotechnical Comment Resolutions
- ☐ Final Geotechnical Report
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Chief Geotechnical Engineer
- ☐ Structural Design Engineer
- ☐ Roadway Design Team
- ☐ Peer Review Committee

Deliverable	Task	Responsible Party	
		Activity Leader	
		Geotechnical Design Engineer	Chief Geotechnical Engineer
Geotechnical Comment Resolutions	▪ Conduct Peer Review Meeting	X	
	▪ Address Review Comments	X	
Final Geotechnical Report	▪ Revise Geotechnical Report	X	
	▪ Finalize Report	X	
	▪ Distribute Final Report	X	X
QC Cover Sheets	▪ Initiate QC Review	X	

Conduct Peer Review Meeting

Address Review Comments

Address all geotechnical related review comments. See *UDOT QC/QA Procedures* for more information about completing a comment resolution form. Submit the comment resolution form to the Peer Review Committee members for review and acceptance of comment resolutions.

Revise Geotechnical Report

Revise the Geotechnical Report according to review comments.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide Checker with check prints to review revisions.
  - Final Geotechnical Report
  - Revised Soil Data Sheets with Location Maps
  - Revised Special Provisions and Specification Revisions
  - Revised Detail Plan Sheets
  - Revised Calculations and Computer Input Printouts
- Provide the Checker with the appropriate cover sheet.
- Complete revisions based on comments by Checker and Back Checker.

Finalize Report

Include engineering stamp and signatures.

Distribute Final Geotechnical Report

Distribute the Final Geotechnical Report to the Chief Geotechnical Engineer, Structural Design Engineer, Roadway Design Team, Peer Review Committee, and geotechnical folder on ProjectWise.

2H1 Develop Initial Structure Hydraulics (For Major Structures)

(back to table)

Overview

Develop preliminary structure hydraulics.

References

- ☐ Drainage Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Draft Structure Hydraulics Report
- ☐ Preliminary Structure Hydraulics Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Structural Engineer
- ☐ Region Hydraulics Engineer
- ☐ Central Hydraulics Engineer
- ☐ Design Leader

Deliverable	Task	Responsible Party Activity Leader Structure Hydraulic Designer
Draft Structure Hydraulics Report	▪ Develop Hydrologic Evaluation	X
	▪ Provide Hydraulic Analysis	X
	▪ Coordinate with Survey Team	X
	▪ Conduct Conflict Analysis	X
	▪ Prepare Draft Structure Hydraulics Report	X
	▪ Coordinate with Central Hydraulics	X
Preliminary Structure Hydraulics Cost Estimate	▪ Develop Preliminary Structure Hydraulics Cost Estimate	X
QC Cover Sheets	▪ Initiate QC Review	X

Develop Hydrologic Evaluation

Identify hydraulic methodology. Develop hydrology and flows for each feature.

Provide Hydraulic Analysis

Based upon drainage design criteria for the project, do the following:

- Evaluate preliminary structures geometry, type, and span.
- Conduct hydraulic analyses to determine opening requirements for large hydraulic structures and/or bridges.
- Evaluate bridge scour.
- Review FEMA Flood Mapping.
- Consider debris flow.

Coordinate with Survey Team

Coordinate with the Survey Team if additional data is needed.

Conduct Conflict Analysis

- Identify potential conflicts with other design elements and utilities.
- Identify design elements inside roadway clear zone.
- Identify design elements outside the project ROW.

Coordinate with Central Hydraulics

Prepare Draft Structure Hydraulics Report

Prepare a draft structure hydraulics report and provide the structures team with necessary information to complete the situation and layout. This may include several iterations, so coordination with the structures team will be on-going. Provide at minimum the following preliminary information:

- Preliminary hydraulic section
- Preliminary scour depth
- Preliminary surface elevations
- Preliminary velocities
- Preliminary low chord

Develop Preliminary Drainage Cost Estimate

- Compile initial drainage bid items and quantities.
  - Verify bid items match UDOT standard bid items exactly.
- Develop unit costs for each item.
  - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.).
  - Document unit cost development, assumptions, etc.
  - Account for project specific factors (see below).
- Use lump sum pricing only when appropriate.
  - Consider contractor risk due to unknown quantity.
  - Consider difficulty in pricing per unit.
  - Consider all materials and labor involved.

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Specialty equipment	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Time of year of advertising	Constructability

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

4H1 Complete Structure Hydraulic Design

(back to table)

Overview

Complete structure hydraulics design and report.

References

- ☐ Drainage Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Structure Hydraulic Comment Resolutions
- ☐ Structure Hydraulic Design
- ☐ Structure Hydraulic Report
- ☐ Structure Hydraulic Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Structures Engineer
- ☐ Region Hydraulics Engineer

Deliverable	Task	Responsible Party Activity Leader Structure Hydraulic Designer
Structure Hydraulic Comment Resolutions	▪ Address Review Comments	X
Structure Hydraulic Design	▪ Finalize Structures Hydraulic Analysis	X
	▪ Complete Scour Protection/Remediation Design	X
Structure Hydraulic Report	▪ Finalized Structures Hydraulic Report	X
Structure Hydraulic Cost Estimate	▪ Enter Structure Hydraulics Cost Estimate into PDBS	X
QC Cover Sheets	▪ Initiate QC Review	X

Address Review Comments

Address all structure hydraulic related review comments. See *UDOT QC/QA Procedures* for more information about completing the comment resolution form. Revise the design based on the comments and discussions.

Finalize Structures Hydraulic Analysis

Complete structures hydraulic analysis in accordance with the Drainage Manual of Instruction. The analysis may take several iterations before finalized. Coordinate with the structures team.

- Include Q_{design}, Q_{100} and Q_{500} analysis flows in the recurrence interval breakout.
- Analyze the design storm frequency.
- Analyze $Q_{existing}$, Q_{design}, Q_{100}, and Q_{500} of the preliminary channel for the existing and proposed bridge/culvert geometry.
- Provide adequate freeboard (≥ 2 feet) for debris passage.
- Analyze the backwater for increase and/or damage for existing and proposed conditions.
  - Do not increase FEMA Flood elevation.
  - For non-FEMA locations do not increase the backwater elevation by more than 1'.
- Coordinate with the structures team to finalize the hydraulic profile.

Complete Scour Protection/Remediation Design

Complete scour protection and remediation design in accordance with the Drainage Manual of Instruction. The design may take several iterations before the finalized. Coordinate with the structures team.

- Design foundation depth to reflect total scour depth for Q_{100}.
- Develop bank scour mitigation measures.
- Analyze the final design using check flood 500 year to determine the bridge stability.
- Address stream alterations and restorations.

Finalize Structures Hydraulic Report

Prepare hydraulics report and submit for acceptance by the Central Hydraulics Engineer. Include all necessary drainage elements and data for the project per the Drainage Manual of Instruction. Include the following relevant sections and corresponding information:

- Cover Page
  - Design/Consultant information
  - Project name and number
  - Structure NBIS number
  - Project location (State route, beginning and ending reference post, near town, County)
  - Date of completion of the report
  - Name of the entity that prepared the report
  - Address of the entity preparing the report
- Table of Contents
  - All sections/chapters (in Roman numerals) with corresponding page numbers
  - All pictures and their titles with corresponding page numbers
  - All tables and their titles with corresponding page numbers
- Section I – Introduction
  - Clear and concise description of the project
  - Reasons for the report

- Objectives of the report
- Involved agencies
- Pertinent general information
- An overview of the report and its organization

- Section I – Location
  - Clear description of the project location and vicinity
  - Location map derived from USGS quad map or better
  - All major highways, towns and other important features near the project's site
  - Clear legal location description of the project
- Section I – Project/Problem Definition
  - Clearly describe physical features (i.e. bridge length, width, type of structure, etc.)
  - Historical definitions
  - Present day conditions
  - Prospects
- Section II – Hydrology
  - Description of drainage basins
  - Drainage map clearly showing drainage features and boundaries
  - Drainage map identifying stream gage locations
  - Run-off calculations and with the following:
    - Explanation of model choice and method of computation
    - Input and output data
  - Organize input and results in a table
- Section II – Hydraulics
  - Clear descriptions of physical features being analyzed
  - Contour map of location
  - Survey of the stream according to survey requirements of the Drainage Manual of Instruction
  - Appendix showing the XYZ coordinates
  - Description of tools used to complete the analysis

Update Structures Hydraulic Estimate

Submit the structures hydraulic estimate to the structures design engineer for inclusion in the total project cost estimate.

- Update structure hydraulic bid items and quantities.
- Update structure hydraulic unit costs (see 2H1).

Enter Structure Hydraulic Estimate Into PDBS

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

1J1 Identify Existing Right-of-Way

(back to table)

Overview

Identify existing right-of-way along the project and adjacent ownerships.

References

- ☐ Right of Way Division Website
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT CADD Standards
- ☐ ePM
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Existing ROW Map
- ☐ Property Spreadsheet
- ☐ QC Cover Sheets

Distribution

- ☐ Project File
- ☐ 1Z4
- ☐ Region ROW Engineer

Deliverable	Task	Responsible Party Activity Leader ROW Designer
Existing ROW Map	▪ Research Existing ROW and Property Boundaries for Project Area	X
	▪ Develop ROW Mapping	X
Property Spreadsheet	▪ Develop Property Spreadsheet	X
	▪ Identify Potential Impacts	X
QC Cover Sheets	▪ Initiate QC Review	X

Research Existing ROW and Property Boundaries for Project Area

For the entire project limits, do the following:

- Identify all property owners.
- Research existing UDOT ROW plans.
    - Obtain tax Ids.

- Obtain county ownership plat maps.
- Obtain mining claims.
- Obtain subdivision plats.
- Obtain Record of Survey plats.

Potential Contacts include the following:

Potential Contacts	
County Recorder	UDOT ROW
BLM Officials	County Surveyor
Utility Companies	Municipality Surveyor
Railroad Companies	Additional Surveyors
Title Companies	

Develop ROW Mapping

Comply with current *UDOT CADD Standards* to develop the ROW mapping.

- Convert existing information into the project coordinate system.
- Develop line work in MicroStation and verify legal description consistency.
- Identify ROW parcel gaps and overlaps that will need to be cleaned up if further action is required on the parcels.

Develop Property Spreadsheet

Develop a spreadsheet containing all owner names, property addresses, and tax ID numbers. Provide the ROW acquisition team with the spreadsheet.

Identify Potential Impacts

Identify potential ROW and easement impacts of all types. Indicate on the property spreadsheet the potential impacts. If possible, identify the level of risk, source (roadway, drainage, etc), and possible mitigations of each impact.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review.

J1A Identify Right-of-Way Needs

(back to table)

Overview

Coordinate with the project team to identify all ROW acquisitions.

References

- ☐ Project Designs
- ☐ Right of Way Division Website
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ List of Parcels Affected by Design
- ☐ Updated ROW Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Central ROW

Deliverable	Task	Responsible Party		
		Activity Leader		
		ROW Designer	Central ROW	Roadway Designer
List of Parcels Affected by Design	▪ Identify Parcels for Acquisition	X		
Updated ROW Estimate	▪ Update ROW Estimate		X	
QC Cover Sheets	▪ Initiate QC Review	X		

Identify Parcels for Acquisition

The ROW Design Engineer coordinates with the project team and Design Leader to identify all parcels affected by the design.

- Create a list of all parcels affected by the design.
  - Verify all owner information.
  - Assign a number to each parcel.
- Continually coordinate with the project team for list updates.

Update ROW Estimate

- Review and update project ROW cost estimate.

- Update the Project Manager on the current status of project ROW estimate.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

J2A Develop Right-of-Way Plans and Documents

(back to table)

Overview

Develop ROW plans and documents. Repeat this activity for each partial, final, and supplemental summary.

References

- ☐ Right of Way Division Website
- ☐ Scanning and Mapping Website
- ☐ Right-of-Way Design Manual
- ☐ UDOT Right-of-Way Operational Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ ROW Plan Sheets
- ☐ ROW Descriptions
- ☐ ROW Documents
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Project Manager
- ☐ Region ROW Engineer

Deliverable	Task	Responsible Party Activity Leader ROW Designer
ROW Plan Sheets	▪ Develop ROW Design	X
	▪ Develop ROW Plan Sheets	X
ROW Descriptions	▪ Develop ROW Descriptions	X
ROW Documents	▪ Develop ROW Documents	X
QC Cover Sheets	▪ Perform QC Review	X

Develop ROW Design

- Develop the ROW plans to show required acquisitions to accommodate all aspects of the project. Include fee ownership, slope easements, temporary construction easements, drainage easements, and utility relocations and easements.
- Include all previous project acquisition parcels. (i.e. include 1st partial summary parcels on the 2nd partial summary plans).
- Adhere to UDOT CADD Standards (levels, styles, etc.).
- Follow requirements and recommendations in the *Right-of-Way Design Manual*.

Develop ROW Plan Sheets

- Develop all sheets according to current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards*.
- Clearly label parcel numbers.

Prepare ROW Descriptions

Prepare legal descriptions for each parcel to be acquired following the *UDOT Right-of-Way Operational Manual*.

Prepare ROW Documents

- Prepare the following documents:
  - Ownership Record - RW51
  - Summary Sheet – RW53
  - Signature Documents (deeds and easements)
  - ePM Summary
  - Vesting Documents
  - Deed Plotter
- Prepare each document in the correct format.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide Checker with check prints of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

K1A Conduct Right-of-Way Review

(back to table)

Overview

Review ROW plans, descriptions, and documents and provide comments.

Deliverables

- ☐ ROW Plan Review
- ☐ ROW Description Review
- ☐ ROW Document Review

Distribution

- ☐ Project File
- ☐ ROW Designer
- ☐ Lead ROW Agent

Deliverable	Task	Responsible Party Activity Leader Region ROW Manager
ROW Plan Review	▪ Review ROW Plans	X
ROW Descriptions Review	▪ Review ROW Descriptions	X
ROW Documents Review	▪ Review ROW Documents	X

Review ROW Plans

Confirm the ROW design accommodates all design features, including all necessary easements, and provide feedback, as required.

Review ROW Descriptions

Review ROW descriptions and provide comments.

Review ROW Documents

Review ROW documents and provide comments.

L1A Conduct Right-of-Way Appraisals

(back to table)

Overview

Appraise each parcel required for the project to determine the fair market value.

References

- ☐ Right of Way Division Website
- ☐ Administrative Compensation Estimates/Waiver Evaluation

Deliverables

- ☐ Complete Appraisal for Each Parcel or Administrative Compensation Estimates/Waiver Evaluation

Distribution

- ☐ Central ROW
- ☐ L2A

Deliverable	Task	Responsible Party	
		Activity Leader	
		Central ROW	Appraiser
Complete Appraisal for Each Parcel or Administrative Compensation Estimates/Waiver Evaluation	▪ Order Appraisal	X	
	▪ Conduct Appraisal		X

Order Appraisal

Assign an appraiser to estimate the value each ROW acquisition.

Conduct Appraisal

- Acquire and review the county tax assessor records.
- Collect and analyze applicable comparable sales data.
- Conduct a drive-by inspection of the property.
- Meet with property owner.
- Complete appraisal.

Note: If administrative compensation estimates, then no review is required; skip L2A.

L2A Review Appraisals

(back to table)

Overview

UDOT staff reviews appraisals from L1A.

References

- ☐ Right of Way Division Website

Deliverables

- ☐ Updated ROW Estimate
- ☐ Approval to Acquire

Distribution

- ☐ ProjectWise
- ☐ Acquisition Agent
- ☐ Project Manager
- ☐ Design Leader

Deliverable	Task	Responsible Party Activity Leader Central ROW
Updated ROW Estimate	▪ Review and Accept Appraisals	X
	▪ Update ePM ROW System	X
	▪ Update Project ROW Estimate	X
Approval to Acquire	▪ Submit for Acquisition	X

Review and Accept Appraisals

Review appraisals from L1A to ensure fair and just compensation.

Update ePM ROW System

Update ePM ROW system with appraised values for each parcel.

Update Project ROW Estimate

Update project ROW estimate with the appraisals.

- Review the percent of completed acquisitions and remaining acquisitions.
- Review the percent of ROW budget spent and remaining estimated budget.
- Update the Project Manager on the current status of ROW acquisition budget.
- Update the Design Leader on the current status of ROW acquisition budget before each milestone meeting.

Submit for Acquisition

Upon approval of appraisals, submit to acquisition agent.

L3A Acquire Right-of-Way

(back to table)

Overview

Acquire ROW.

References

- ☐ Right of Way Division Website

Deliverables

- ☐ Purchase Contract
- ☐ Deed
- ☐ Updated ROW Budget

Distribution

- ☐ ProjectWise
- ☐ Project Manager

Deliverable	Task	Responsible Party	
		Activity Leader	
		Central ROW	Acquisition Agent
Purchase Contract	▪ Set Up files	X	
	▪ Initiate Negotiations		X
	▪ Obtain Right to Occupy, Acquire Property, or Recommend Alternate Resolutions		X
	▪ Submit File for Approval or Condemnation		X
Deed	▪ Check Title		X
	▪ Order Check	X	
	▪ Send Check to Owner, Title Company, or Court	X	
	▪ Record Deeds	X	
Updated ROW Budget	▪ Review Project ROW Budget	X	

Set Up files

Initiate Negotiations

Present a written offer to all parties of interest for each ownership.

Obtain Voluntary Right to Occupy, Acquire Property, or Recommend Condemnation

- Determine whether a right to occupy can be acquired or if the property needs to go to condemnation.
- Send an options letter.
- If a condemnation, submit a Request for Condemnation memo.

Submit File for Approval or Condemnation

Submit File for Approval of Contract or Approval of Condemnation Memo.

Check Title

For total acquisitions, send the title to the title company for review and closing.
For partial acquisitions, follow title and closing process.

Order Check

Send Check to Owner, Title Company or Court

Record Deeds

Review Project ROW Budget

Review project ROW budget for actual vs. estimated.

- Review the percent of completed acquisitions and remaining acquisitions.
- Review the percent of ROW budget spent and remaining estimated budget.
- Update the Project Manager on the current status of ROW acquisition budget.
- Update the Design Leader on the current status of ROW acquisition budget before each milestone meeting.

L4A Condemn Right-of-Way

(back to table)

Overview

Complete the condemnation process for parcels that cannot be amicably acquired.

References

- ☐ Right of Way Division Website

Deliverables

- ☐ Order of Occupancy
- ☐ Property Deed
- ☐ Updated ROW Budget

Distribution

- ☐ ProjectWise
- ☐ Project Manager

Deliverable	Task	Responsible Party Activity Leader Central ROW
Order of Occupancy	▪ Obtain Memo from Director of ROW to Start Condemnation	X
	▪ Review Title Report	X
	▪ Review Legal Description	X
	▪ Review ROW Maps	X
	▪ Prepare Condemnation Resolution	X
	▪ Submit to Attorney General's Office with Check	X
	▪ Attorney General Obtain Order of Occupancy	X
Property Deed	▪ Obtain Property Deed	X
Update ROW Budget	▪ Review Project ROW Budget	X

Obtain Memo from Director of ROW to Start Condemnation

Review Title Report

Review Legal Description

Review ROW Maps

Prepare Condemnation Resolution

Submit to Attorney General's Office with Check

Attorney General Obtain Order of Occupancy

Obtain Property Deed

Review Project ROW Budget

Review project ROW budget actual vs. estimated.

- Review the percent of completed acquisitions and remaining acquisitions.
- Review the percent of ROW budget spent and remaining estimated budget.
- Update the Project Manager on the current status of ROW acquisition budget.

L5A Relocate Occupants

(back to table)

Overview

Assist occupants through the relocation process.

References

- ☐ Right of Way Division Website

Deliverables

- ☐ Documentation of Relocation
- ☐ Updated ROW Budget

Distribution

- ☐ ProjectWise
- ☐ Project Manager

Deliverable	Task	Responsible Party	
		Activity Leader	
		Central ROW	Relocation Specialists
Documentation of Relocation	▪ Relocate Occupants		X
Updated ROW Budget	▪ Review Project ROW Budget	X	

Relocate Occupants

- Meet with the displaced person
- Prepare a relocation study
- Provide a notice of eligibility
- Monitor moves (i.e., make sure they move)
- Prepare and file claims
- Review and approve claims

Review Project ROW Budget

Review project ROW budget for actual vs. estimated.

- Review the percent of completed acquisitions and remaining acquisitions.
- Review the percent of ROW budget spent and remaining estimated budget.
- Update the Project Manager on the current status of ROW acquisition budget.

5L1 Deliver Right-of-Way Certification

(back to table)

Overview

Prepare and approve ROW certification.

References

- ☐ Right of Way Division Website

Deliverables

- ☐ Signed ROW Certification

Distribution

- ☐ Project File
- ☐ Project Manager
- ☐ Region ROW Engineer
- ☐ Resident Engineer
- ☐ FHWA (if applicable)

Deliverable	Task	Responsible Party	
		Activity Leader	
		Central ROW	Project Manager
Signed ROW Certification	▪ Submit Certification Request		X
	▪ Verify Parcel Status	X	
	▪ Approve ROW Certification	X	
	▪ Provide Documents for Construction	X	

Submit Certification Request

Verify Parcel Status

Verify that all parcels have been acquired or that a right-of-entry has been issued. Verify that any occupants have been relocated or will relocate before construction begins.

Approve ROW Certification

If all parcels are cleared, sign the ROW certification. If all parcels are not cleared, certify the project pending the limitations of operations. Estimate the timeline for parcel clearance and forward to the Phase Leader for inclusion in the project specifications. Submit the certification to the Phase Leader and Central Construction.

Provide Documents for Construction

- Prepare a package including the following:
  - ROW Plans
  - Deeds
  - Purchase Contract
  - Agreements
  - Correspondence with Property Owners
- Give thirty days notice to the local city and/or county surveyor advising them of any monuments within or adjacent to the UDOT ROW, which may be destroyed during construction.

This page intentionally left blank

2M1 Develop Pavement Design and Report

(back to table)

Overview

Evaluate the existing pavement condition and compare the results of the evaluation to the existing conditions documented in the concept phase preliminary pavement design. If a concept pavement design is not available, evaluate the existing pavement conditions to assess the level of pavement design needed. Confirm the concept report pavement design remains applicable and update/create the pavement design.

References

- ☐ Pavement Management and Design Manual
- ☐ Ride Index
- ☐ Distress Manual
- ☐ Pavement Type Determination
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Pavement Conditions Report
- ☐ Pavement Design Report
- ☐ QC Cover Sheet

Distribution

- ☐ ProjectWise
- ☐ Region Materials Engineer
- ☐ State Pavement Design Engineer

Deliverable	Task	Responsible Party Activity Leader Pavement Designer
Pavement Conditions Report	▪ Review Concept Report	X
	▪ Determine Existing Pavement Conditions	X
	▪ Write Pavement Conditions Report	X
	▪ Obtain Approval of Pavement Conditions Report	X
Pavement Design Report	▪ Develop Pavement Design	X
	▪ Write Pavement Design Report	X
	▪ Obtain State Pavement Manager Approval	X
QC Cover Sheet	▪ Initiate QC Review	X

Review Concept Report

If concept report exists, review existing conditions report and pavement design.

- Pavement scope
  - Testing strategy used
  - Proposed design life
  - Additional testing required from testing strategy
  - Potential material sources
- Testing
  - Core and trench for thickness and condition of existing pavement
  - Extraction/gradation on cores
  - Strength and stripping tests
  - Trench for sub-base and sub-grade samples
  - Concrete pavement evaluation
  - Falling Weight Deflectometer testing
- Centerline Soil Survey Report
  - California Bearing Ratio
  - Soil Classification-Plastic Limit
  - Liquid Limit
  - Plastic Index
  - Soluble Salts
  - Resistivity
  - pH
- Identify and determine mode(s) of failure for the existing pavement.
- Evaluate the need for under drains and coordinate with the project Hydraulic Engineer.
- Review pavement design options used.
- Review engineering and economic analysis of options.
- Verify the design is the best option.
- Look at updated traffic data to verify that the pavement design remains applicable.

Determine Existing Pavement Conditions

If the preliminary pavement design exists, do the following:

- Conduct a field review to determine the validity of the pavement conditions assumed in the preliminary pavement design. If the current pavement conditions are not consistent with those assumed in the preliminary pavement design, conduct a field review according to the instructions for a non-existent preliminary pavement design found below.

If the preliminary pavement design does not exist, do the following:

- Conduct a field review to determine the existing pavement conditions. This review will be used in developing the pavement design.
- Determine the condition of the existing pavement following the Pavement Management and Design Manual.
  - Use detailed data sheets from the Statewide Pavement Survey.

- Research the pavement history.
- If needed, supplement the data by obtaining and testing additional cores. Also, for full-depth pavement sections, obtain and test soil samples.
    - Develop a preliminary testing strategy and submit to the Region Pavement Manager for acceptance. Consider the following test:
        - Falling weight deflectometer or structural measurements
        - Rut measurements, ride index, and cracking type and extent
        - Skid index
        - Traffic data (i.e. traffic projections)
        - Ground penetrating radar
    - Perform and document appropriate tests, including the following:
- Determine the pavement type using the following steps.
    - Check Regional Corridor determination list.
    - Pavement design analysis with project specific constraints.
    - Life cycle analysis and other economic concerns.
    - Engineering analysis.
- Evaluate possible project pavement alternatives based on existing pavement conditions.
    - Reconstruction vs. Repave
    - Cost of alternatives
    - Design Life
    - Maintenance

Write Existing Pavement Conditions Report

If the current pavement conditions match the pavement conditions assumed in the preliminary pavement design, do the following:

- Write a memo affirming the pavement conditions assumed in the preliminary pavement design.

If the current pavement conditions do not match the pavement conditions assumed in the preliminary pavement design or if the preliminary pavement design does not exist, do the following:

- Write a pavement conditions report assessing the current conditions of the pavement and assume the pavement conditions at the time of construction.

Obtain Approval of Pavement Conditions Report

Submit the pavement conditions report to the Region Pavement Manager to obtain approval. If necessary, address concerns and resubmit for approval.

Develop Pavement Design

Following the *Pavement Management and Design Manual*, complete the pavement design. Perform the following at a minimum:

- Determine reconstruction or rehabilitation.
- Determine potential material sources.
    - Consider material parameters.

- Review traffic data and projections.
- Analyze information using approved methodology (i.e. ASHTO 93, MEPDG, etc.).
    - Use appropriate parameters.
    - List all assumptions.

Write Pavement Design Report

Provide a detailed report of the pavement design according to the *Pavement Management and Design Manual*.

- Clearly describe all assumptions.
- Include all parameters used in analysis.
- Describe and justify all recommendations.
- Clearly and completely describe all conclusions.
    - Reconstruction vs. Repave
    - Cost of alternatives
    - Design life
    - Maintenance
    - Life cycle cost calculations
    - Constructability sensitivity
    - Adjustments for construction specifications

Obtain State Pavement Manager Approval

Submit and obtain approval for the Pavement Design Report from the State Pavement Manager approval.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before submitting for approval or** distribution.

- Provide Checker with check prints of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

1P1 Develop Initial Public Involvement Plan

(back to table)

Overview

Create a PI plan for the design phase based on the UDOT template. Include key messages, project stakeholders, commitments made to stakeholders in previous project phases, a project team communication plan, media outreach for the project, and a schedule. Tailor the PI plan to the project and include only items and detail as needed.

References

- ☐ UDOT Project Outreach Planner (POP)
- ☐ Public Involvement Resources & Templates
- ☐ Public Involvement Consultants
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ Initial PI Plan
  - PI Activities Schedule
  - Stakeholders List
  - Media Outreach Plan
  - Contractor Incentives
- ☐ Project Document Cover Sheet (QC)

Distribution

- ☐ Region Public Involvement Manager (PIM)
- ☐ Design Leader
- ☐ ProjectWise

Deliverable	Task	Responsible Party	
		Activity Leader	
		Region PIM	Project PIM
Initial PI Plan	▪ Develop POP and PI Plan	X	
	▪ Develop PI Activities Schedule		X
	▪ Update/Create Stakeholders List		X
	▪ Develop Media Outreach Plan	X	
	▪ Determine Need for and Magnitude of Contractor Incentives		X
Project Document Cover Sheet	▪ Initiate QC Review		X

Develop POP and PI Plan

Develop a PI Plan that reflects the project's POP level. Coordinate with ROW to determine the anticipated level of impact to the stakeholders. Include the following elements in the plan:

- Project type
- Design target dates
- Design contacts
- A brief project description that includes the following:
  - An overview of other projects in the area
  - Milestones
- Key messages
- Any commitments made from previous project phases
- Design elements or considerations that could be influenced by PI
- Communication plan, include the following at a minimum:
  - Internal communications plan
  - Notification methods
  - How comments will be collected and addressed
  - Address other communication needs
- A list and schedule for PI activities (see below for details)
- A list of group and individual project stakeholders

Develop PI Activities Schedule

Complete the following and then include in the PI plan:

- Develop a list of tasks for the project based on the scope of work.
- Identify target group(s) for each task.
- Determine the purpose/goal of each task.
- Determine the completion date/time frame of each task.
- Determine the stakeholders level of involvement.

Update/Create Stakeholders List

Depending on the type of project, update or create the stakeholders list.

- Locate any existing stakeholder databases for the area.
- Include all known contact information.
- Identify potential key stakeholders and verify information.
- If applicable, include previous comments and key concerns.

Develop Media Outreach Plan

- Identify media outlets and primary contact(s).
- Determine the level of media outreach required.
  - Address need for press releases.
  - Address need for legal notice.
  - Address need to purchase advertising.

- Consider a press release announcing the approval of the environmental document.

Determine Need for and Magnitude of Contractor Incentives

Incentives are based on potential impacts to businesses, commuters, and residents:

- Consider the makeup of the stakeholder committee.
- Estimate the cost of the incentive program.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

4P1 Revise/Implement Public Involvement Plan

(back to table)

Overview

Based on the project needs, enhance or implement the project's PI plan to prepare for design. Activities during this phase set the stage for efficient and effective public outreach.

References

- ☐ UDOT POP
- ☐ Public Involvement Resources & Templates
- ☐ Public Involvement Consultants
- ☐ Partners for the Road Ahead Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ Revised PI Plan
  - Revised POP
  - Revised Stakeholders List
  - Project Branding
  - Business Cards
  - Website/Summary Page
  - Public Meeting Materials
  - Outreach Materials
  - Comment Forms and Resolutions
  - Correspondence Record
- ☐ PI Status Summary (for each review meeting)
- ☐ PI Transition Handoff Package (PS&E Stage only)
- ☐ Project Document Cover Sheets (QC)

Distribution

- ☐ Region PIM
- ☐ Stakeholders (As Needed)
- ☐ ProjectWise

Deliverable	Task	Responsible Party	
		Activity Leader	
		Region PIM	Project PIM
PI Plan	▪ Update POP and PI Plan	X	
	▪ Update Media Outreach Plan	X	
	▪ Draft and Distribute Press Release	X	
	▪ Update Stakeholders List		X
	▪ Update PI Activities Schedule		X
	▪ Develop Project Identity and Branding		X
	▪ Develop Project Website and/or Summary Page		X
	▪ Develop Stakeholder Committee (If Needed)		X
	▪ Develop and Distribute Project Outreach Materials		X
	▪ Attend Public Activities and Meetings to Provide Project Information		X
	▪ Communicate with Stakeholders		X
PI Status Summary	▪ Compile PI Status Summary		X
PI Transition Handoff Package	▪ Compile PI Transition Handoff Package		X
Project Document Cover Sheets	▪ Perform QC/QA Review		X

Update POP and PI Plan

Update the project POP and project PI plan. Coordinate with ROW to determine the updated anticipated level of impact to the stakeholders. Update the following elements as needed based on the revised scope:

- Project type
- Design target dates
- Design contacts
- Brief project description including:
  - Overview of other projects in the area
  - Milestones
- Key messages
- Commitments made from previous project phases
- Design decisions to be influenced by PI
- The communication plan
- The list and schedule for PI activities (see above for details)
  - The list of group and individual project stakeholders

Update Media Outreach Plan

- Update media outlets and primary contact(s).
- Revise the level of media outreach required.
    - Review need for press releases.
    - Review need for legal notice.
    - Review need to purchase advertising.

Draft and Distribute Press Release (as needed)

- Identify local and regional print, television, and radio contacts for project information distribution.
- Assist with creating and distributing press release information to local and regional media
    - As needed, draft the press release that notifies the public of the start of the project and provides project team contact information.
    - Distribute to the Region PIM or the UDOT Communications office to be distributed to publications.

Update Stakeholders List

Update the stakeholders list based on new information.

- Coordinate with ROW Design team to determine if any stakeholders have changed.
- Coordinate with the Design Leader to determine if any stakeholders are to be eliminated or added to the list based on design updates.
- Identify key stakeholders.
- Update stakeholder comments and concerns.

Update PI Activities Schedule

Update the PI activities schedule based on decisions and updates to the project design:

- Update the list of tasks for the project based on the revised scope of work.
- Update/identify target group(s) for each task.
- Update/determine the purpose/goal of each task.
- Update/determine the completion date/time frame of each task.
- Update the level of stakeholder involvement.

Develop Project Identity and Branding

Develop project identity and branding in accordance with UDOT's latest standards and guidelines. Verify all information is correct before production.

- Develop a project logo.
- Develop project identity templates.
- Develop project business/contact cards.
- Develop other outreach and branding materials (e.g., door hangers, fact sheets, magnets, or postcards).

Develop Project Website and/or Summary Page

- Develop a project website and link to the appropriate web pages and servers.
- If no website is required, send regular updates to UDOT personnel.

Develop Stakeholder Committee

- Determine potential members.
- Develop a plan for meetings.

Develop and Distribute Project Outreach Materials

Develop all project outreach materials in accordance with UDOT's latest style guide and standards

- Develop and hand out information sheet(s) to stakeholders.
- Develop and send electronic news updates to news agencies (e.g., local paper or special publications).
- Develop and mail newsletters to stakeholders.
- Verify all materials and messages are consistent with each other.
- If the project design is used, verify the design is the latest version.

Attend Public Activities and Meetings to Provide Project Information

Prepare and present project information to city councils, chambers of commerce, neighborhood meetings, etc.

Communicate with Stakeholders

Constant communication with stakeholders is necessary for a successful project.

- Respond to and document stakeholder comments.
- Follow up on commitments made to the stakeholders.
- Provide updates for project milestones to interested stakeholders/general public.
- Hold one-on-one meetings with stakeholders.
- Provide the *Partners for the Road Ahead Guide* to businesses to help them through the construction process.

Compile PI Status Summary

For each review meeting, compile a PI status summary that includes the following:

- An overview of PI tasks
- Copies of all stakeholder correspondence and communication (e.g., emails, letters, or phone logs)
- Responses to comments
- Commitments to stakeholders
- Analysis (Lessons Learned)
- Copies of outreach materials
- Meeting materials and summaries

Compile PI Transition Handoff Package

Compile all developed PI items, tools, and information to be handed over to the construction PI personnel. Prepare the package so that the construction PI personnel will understand the PI decisions, communications, and work done during the design process. Include the following:

- List of PI contacts for utilities
- All local government contacts that may be performing work in the area
- Stakeholder contact list
- Final Design Phase PI Report
- Applicable ROW records
- MOT plans

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

1Q1 Assess Existing Roadway Drainage Conditions

(back to table)

Overview

Review existing conditions and develop recommendations for improvements.

References

- ☐ Drainage Manual of Instruction
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary Drainage Summary
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Region Hydraulics Engineer
- ☐ Design Leader

Deliverable	Task	Responsible Party Activity Leader Roadway Hydraulic Designer
Preliminary Drainage Summary	▪ Request ProjectWise Folder	X
	▪ Obtain As-Built Info	X
	▪ Conduct Drainage Conditions Field Review	X
	▪ Meet with Maintenance Onsite	X
	▪ Develop Drainage Design Criteria	X
	▪ Recommend Drainage Improvements	X
	▪ Estimate Drainage Improvements Costs	X
	▪ Provide Preliminary Drainage Summary for Scoping Meeting	X
QC Cover Sheets	▪ Initiate QC Review	X

Request ProjectWise Folder

Obtain As-Built Info

Obtain as-built and master plan information from the following possible sources:

- Local government infrastructure
- County
- Irrigation companies
- UDOT
- Other available sources

Conduct Drainage Conditions Field Review

Assess the location, material type, geometry, and condition of existing drainage structures. Evaluate the following:

- Existing drainage patterns
  - Bridges (specifically, assess the scour potential of floodplain encroachments)
- Existing roadway drainage problems (e.g., ponding and excessive spread)
- Culverts and Storm Drain systems
  - Determine the following
    - Capacity
    - Connectivity
    - Condition
      - Suitability for extension
      - Suitability for rehabilitation
      - Need for replacement
- Outfall locations
- Detention/retention ponds
- Channels and ditches
  - Determine the following
    - Capacity
    - Locations with scour or erosion problems
    - Energy dissipators
- Irrigation facilities and connectivity
- Permitting concerns

Meet with Maintenance

Meet with maintenance personnel to identify drainage problems. This meeting may occur at Kickoff, but if not, coordinate with maintenance and other disciplines to schedule an onsite meeting.

Develop Drainage Design Criteria

Determine the governing criteria for the project's hydraulic design by referring to UDOT's *Drainage Manual of Instruction*. Consider the following:

- Hydrology
- Roadway Drainage
- Storm Drains
- Culverts
- Under Drains

- Irrigation Systems
- Ditches
- Major Structures (bridge, box culverts, etc.)
- Detention/Retention Ponds
- Clear Zone Design Constraints
- Water Quality

Recommend Drainage Improvements

- Determine preliminary capacity needed for each drainage facility (i.e., perform hydrologic calculations).
- Evaluate existing hydraulic facilities for suitability to convey calculated flows.
- Identify possible deficiencies due to the proposed project.
- Recommend improvements based on the capacity and physical condition of existing facilities.
- Estimate the approximate size and location of new facilities needed to address deficiencies.

Estimate Drainage Improvements Costs

Estimate the costs of proposed drainage improvements. Carefully evaluate reasonable costs, risks, and contingency. Use best engineering practices to find a balance between probable costs and risk.

Provide Preliminary Drainage Summary for Scoping Meeting

The Preliminary Drainage Summary will include the following:

- Existing drainage conditions summary
- Preliminary location and size of recommended improvements
- Priority of recommended improvements
- Consider construction phasing and limitations
- Preliminary drainage cost estimate
- Updated design schedule
- Drainage Design Criteria

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

2Q1 Develop Initial Roadway Drainage

(back to table)

Overview

Develop preliminary roadway drainage.

References

- ☐ Drainage Manual of Instruction
- ☐ UDOT CADD Standards
- ☐ Preliminary Drainage Summary (1Q1)
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Initial Drainage Design Layout (for Initial Roadway Model 2R1)
- ☐ Preliminary Drainage Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Roadway Designer (2R1)
- ☐ Design Leader
- ☐ Region Hydraulics Engineer

Deliverable	Task	Responsible Party Activity Leader Structure Hydraulic Designer
Initial Drainage Design Layout	▪ Develop Hydrologic Evaluation	X
	▪ Provide Hydraulic Analysis	X
	▪ Develop Preliminary Storage Facilities	X
	▪ Conduct Conflict Analysis	X
	▪ Coordinate with Roadway Design Team	X
	▪ Coordinate with Survey Team	X
	▪ Coordinate with Utilities Team	X
	▪ Provide Preliminary Drainage Layout	X
Preliminary Drainage Cost Estimate	▪ Update Preliminary Drainage Cost Estimate	X
QC Cover Sheets	▪ Initiate QC Review	X

Develop Hydrologic Evaluation

Identify hydraulic methodology. Develop hydrology and flows for each feature. Determine the following:

- Design storm frequency and intensity.
- Time of concentration

Provide Hydraulic Analysis

Based upon drainage design criteria for the project, do the following:

- Identify all necessary drainage features based on proposed and existing conditions of the roadway elements. (e.g. recommended horizontal/vertical alignments, existing drainage systems).
- Identify conveyance methods (storm drain, ditch, or culvert).

Develop Preliminary Storage Facilities

Evaluate preliminary storage needs and determine preliminary layout of storage facilities.

Conduct Conflict Analysis

- Identify potential conflicts with other design elements.
- Identify potential conflicts with existing and proposed utilities.
- Identify design elements inside roadway clear zone.
- Identify design elements outside the project ROW.

Coordinate with Roadway Design Team

Coordinate with the roadway designer to determine recommended roadway horizontal and vertical alignments that accommodate the necessary drainage features.

Coordinate with Survey Team

Coordinate with the Survey Team if additional data is needed.

Coordinate with Utilities Team

Coordinate with the utility designer to request additional utility data if needed.

Develop Preliminary Drainage Cost Estimate

- Compile initial drainage bid items and quantities.
  - Use UDOT standard bid items.
- Develop unit costs for each item.
  - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.).
  - Document unit cost development, assumptions, etc.
  - Account for project specific factors (see below).
- Use lump sum pricing only when appropriate.
  - Consider contractor risk due to unknown quantity.
  - Consider all materials and labor involved.

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Time of year	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Specialty equipment	Constructability

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

2Q2 Develop Initial Irrigation Design

(back to table)

Overview

Lay out the initial irrigation design.

References

- ☐ Drainage Manual of Instruction
- ☐ UDOT CADD Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Initial Irrigation Design Layout
- ☐ Preliminary Irrigation Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Region Hydraulics Engineer

Deliverable	Task	Responsible Party Activity Leader Roadway Hydraulic Designer
Initial Irrigation Design Layout	▪ Meet with Irrigation Company	X
	▪ Develop Irrigation System Layout	X
	▪ Provide Initial Irrigation Design Layout	X
	▪ Coordinate with Roadway Design Team	X
	▪ Coordinate with Survey Team	X
	▪ Coordinate with Utilities Team	X
Preliminary Irrigation Cost Estimate	▪ Develop Preliminary Irrigation Cost Estimate	X
QC Cover Sheets	▪ Initiate QC Review	X

Meet with Irrigation Company

- Obtain information regarding the irrigation system operation and connectivity by meeting with irrigation company officials and/or ditch masters.
- Obtain operational flows (if available) and design criteria.
- Determine requirements for agreements.

Develop Irrigation System Layout

- Model and document the existing irrigation system with special emphasis on flow splitting/measurement elements.
- Identify preliminary locations of diversion structures and flow measurements elements.
- Develop initial pipe sizes and ditch geometry.
- Evaluate hydraulic performance

Coordinate with Roadway Design Team

Coordinate with the roadway designer to determine recommended roadway horizontal and vertical alignments that accommodate the necessary drainage features.

Coordinate with Survey Team

Coordinate with the Survey Team if additional data is needed.

Coordinate with Utilities Team

Coordinate with the utility designer to request additional utility data if needed.

Develop Preliminary Irrigation Cost Estimate

- Compile initial roadway bid items and quantities.
  - Verify bid items match UDOT standard bid items exactly as much as possible.
- Develop unit costs for each item.
  - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.).
  - Document unit cost development, assumptions, etc.
  - Account for project specific factors (see below).
- Use lump sum pricing only when appropriate.
  - Consider contractor risk due to unknown quantity.
  - Consider difficulty in pricing per unit.
  - Consider all materials and labor involved.

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Time of year	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Specialty equipment	Constructability

Provide Initial Irrigation Design Layout

Provide the Design Leader with the initial irrigation design layout in the format determined by the Project Manager and Reviewers. Include the following:

- Location and initial sizing of the proposed irrigation improvements.
- Location of the potential conflicts and conflict resolution options.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

3Q1 Complete Roadway Drainage Design

(back to table)

Overview

Develop the roadway drainage and/or open channel drainage features.

References

- ☐ Drainage Manual of Instruction
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Drainage Comment Resolutions
- ☐ Roadway Drainage Design
- ☐ Preliminary Drainage Plan and Profile Sheets
- ☐ Drainage Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Region Hydraulics Engineer

Deliverable	Task	Responsible Party Activity Leader Roadway Hydraulic Designer
Drainage Comment Resolution s	▪ Address Review Comments	X
Roadway Hydraulic Design	▪ Finalize Hydraulic Analysis	X
	▪ Complete Storm Inlet Design	X
	▪ Complete Storm Drainage Design	X
	▪ Complete Culvert Design	X
	▪ Identify Potential Conflicts	X
Preliminary Drainage Plan and Profile Sheets	▪ Complete Preliminary Drainage Plan and Profile Sheets	X
Drainage Cost Estimate	▪ Update Drainage Cost Estimate	X
QC Cover Sheets	▪ Initiate QC Review	X

Address Review Comments

Address all drainage related review comments. See *UDOT QC/QA Procedures* for more information about completing the comment resolutions. Revise the design based on comments and discussions.

Complete Storage Facility Design

Complete storage facility design in accordance with the *Drainage Manual of Instruction*.

- Perform routing of check flood.
- Complete the storage facility design.
  - Develop inflow hydrograph.
  - Calculate storage volume breakout.
  - Develop grading and depth requirements.
  - Identify outlet locations.
  - Analyze release rate.
  - Design control structures.
  - Identify provisions for maintenance (such as berms and access ramps).
- Evaluate the earthwork.

Complete Storm Inlet Design

The following should be considered in completing the storm inlet design in accordance with the *Drainage Manual of Instruction*.

- Design inlet spacing per Design Criteria
- Minimum time of concentration
- Maximum access spacing based on storm drain size
- Sag locations
- Debris and clogging of storm drain inlet
- Grate inlet type

Complete Storm Drain Design

The following should be considered in completing the storm drain design in accordance with the Drainage Manual of Instruction.

- Minimum and maximum velocity
- Minimum pipe sizes
- Hydraulic grade lines (HGLs) are one foot or more below the finished grade pavement surface at all times for the design storm.
- Determine appropriate storm drain material type based on corrosiveness of native material
- Energy Dissipation needs
- Flood inundation of storm drain system (Design Check)
- Environmental restrictions of water quality for outfall
- Establish vertical profile of storm drain and ditches.
- Evaluate the earthwork.

Complete Culvert Design

The following should be considered in completing the culvert design in accordance with the *Drainage Manual of Instruction*.

- Culvert capacity and freeboard
- Placement of headwall and end-sections
- Determine appropriate culvert material type based on corrosiveness of native material
- Energy dissipation needs
- Evaluate the earthwork

Identify Design Conflicts

Identify design conflicts (utilities, roadway, ROW, etc.) with proposed drainage features. Coordinate with other discipline to evaluate design alterations to mitigate conflicts. Coordinate with the Region Utility and Railroad Coordinator and Utility Designer to identify all potential utility conflicts and potential SUE Level A.

Prepare Preliminary Drainage Plan and Profile Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to develop preliminary plan sheets for review. These sheets are to provide a review of the final designs. It is recommend that only the information required for review be placed on the sheets at this time. Verify with the project manager the expected level of effort for the review submittal. All information on the sheets must go through the QC review procedure before distribution. Combine plan sheets with other designs when appropriate.

- Conform to General Plan Sheet Requirements of the UDOT Plan Sheet Development Standards.
- Follow and maintain CADD standards on each sheet.
- Include all information necessary for review (callouts, notes, etc.).

Update Drainage Cost Estimate

- Update drainage bid items and quantities.
- Update drainage unit costs (see 2Q1).

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

3Q2 Complete Irrigation Design

(back to table)

Overview

Complete the layout of irrigation features.

References

- ☐ Drainage Manual of Instruction
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Irrigation Comment Resolutions
- ☐ Irrigation Design
- ☐ Preliminary Irrigation Plan and Profile Sheets
- ☐ Irrigation Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Region Hydraulics Engineer
- ☐ Design Leader

Deliverable	Task	Responsible Party Activity Leader Roadway Hydraulic Designer
Irrigation Comment Resolutions	▪ Address Review Comments	X
Irrigation Design	▪ Complete Irrigation Design	X
Preliminary Irrigation Plan and Profile Sheets	▪ Prepare Preliminary Irrigation Plan and Profile Sheets	X
Irrigation Cost Estimate	▪ Update Irrigation Cost Estimate	X
QC Cover Sheets	▪ Initiate QC Review	X

Address Review Comments

Address all irrigation related review comments. See *UDOT QC/QA Procedures* for more information about completing the comment resolutions. Revise the design based on comments and discussions.

Complete Irrigation Design

- Establish rim elevations for diversion structures based on operating head of the system.
- Establish vertical profile of irrigation pipes and ditches.
- Re-establish diversion points. If diversions are being abandoned, obtain written notification from ditch master.
- Determine appropriate storm drain material type based on corrosiveness of native material.
- Ensure all irrigation culverts extend from one ROW boundary to the other.

Prepare Preliminary Drainage Plan and Profile Sheets

Follow the current *UDOT CADD Standards and UDOT Plan Sheet Development Standards* to develop preliminary plan sheets for review. These sheets are to provide a review of the final designs. It is recommend that only the information required for review be placed on the sheets at this time. Verify with the project manager the expected level of effort for the review submittal. All information on the sheets must go through the QC review procedure before distribution. Combine plan sheets with other designs when appropriate.

- Conform to General Plan Sheet Requirements of the UDOT Plan Sheet Development Standards.
- Follow and maintain CADD standards on each sheet.
- Include all information necessary for review (callouts, notes, etc.).

Update Irrigation Cost Estimate

- Update irrigation bid items and quantities.
- Update irrigation unit costs (see 2Q3).

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

4Q1 Complete Drainage/Irrigation Plan Sheets and Documents

(back to table)

Overview

Revise the drainage and irrigation designs based on the plan-in-hand review. Complete drainage and irrigation plan set and documents. Finalize the hydraulics report.

References

- ☐ Drainage Manual of Instruction
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Standard and Supplemental Specifications
- ☐ UDOT Plan Sheet Development Standards
- ☐ Specification Writer's Guide
- ☐ Measurement and Payment Template
- ☐ Acceptance and Documentation Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Drainage/Irrigation Comment Resolutions
- ☐ Drainage/Irrigation Plan Sheets
- ☐ Drainage/Irrigation Project Documents
- ☐ Drainage/Irrigation Cost Estimate
- ☐ Drainage Report
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Region Hydraulics Engineer

Deliverable	Task	Responsible Party Activity Leader Roadway Hydraulic Designer
Drainage/Irrigation Comment Resolutions	▪ Address Review Comments	X
Drainage/Irrigation Plan Sheets	▪ Revise Drainage/Irrigation Designs	X
	▪ Complete Drainage and Irrigation Plan and Profile Sheets	X
	▪ Complete Drainage and Irrigation Details and Plan Sheets	X
	▪ Complete Drainage and Irrigation Summary Sheets	X
Drainage/Irrigation Cost Estimate	▪ Finalize Drainage/Irrigation Cost Estimate	X
	▪ Enter Drainage/Irrigation Cost Estimate into PDBS	X
Drainage/Irrigation Project Documents	▪ Complete Drainage and Irrigation Project Documents	X
Drainage Report	▪ Prepare Drainage Report	X
QC Cover Sheets	▪ Initiate QC Review	X

Address Review Comments

Address all drainage and irrigation related comments. See *UDOT QC/QA Procedures* for more information about completing the comment resolutions. Revise the design based on comments and discussions.

Revise Drainage/Irrigation Designs

Based on review comments and coordination with other disciplines, revise the drainage and irrigation designs as needed.

Complete Drainage and Irrigation Plan and Profile Sheets

Complete all drainage and irrigation plan and profile sheets in accordance with UDOT and Federal standards.

- Conform to *UDOT Plan Sheet Development Standards*.
  - General plan sheet requirements.
- Maintain CADD standards on each sheet (i.e. lines styles shown correctly, cell scaling, etc.).
- Include all necessary notes, callouts, legends, etc.
  - Identify all existing drainage facilities.
    - Existing water features (river, stream, creek, lake), canals, ditches, and pipes.
    - Call out all protect-in-place existing facilities.
  - Identify all proposed drainage facilities.

- Provide drainage structure grate/rim elevations.
- Provide station and offset information necessary for construction.
- Identify and number all pipes, culverts, inlets, etc.
- Identify all proposed conveyance methods.
    - Identify all slopes.
    - Call out all sizes or cross sections.
    - Design flows and velocities.
    - Hydraulic grade line.
    - Inflow and outflow elevations.
    - Energy dissipation locations and methods.
    - Vertical profiles for each conveyance method.
        - Profiles follow the individual alignment (not the roadway).
- Identify and reference standard drawings and details correctly.
- Clearly organize all information.
- Make sure all symbols and line styles used are identifiable.
- Make sure pay item callouts match the cost estimate exactly.
- Indicate all utility conflicts on both the plan and profile.

Complete Drainage and Irrigation Details

Conform to *UDOT CADD Standards* to complete the drainage and irrigation details. Develop all details necessary for construction. Conform to *UDOT Plan Sheet Development Standards* to prepare drainage and irrigation detail plan sheets.

- Develop diversion features including structures and gates.
- Develop flow measurement devices.
- Develop all other details necessary for construction of the project.
- Prepare detail plan sheets.
    - General Plan Sheet Requirements.
    - Detail Sheet Requirements.
    - Include all necessary notes, callouts, dimensions, symbols, etc.
    - Make sure all symbols and line styles are identifiable.

Complete Drainage and Irrigation Summary Sheets

- Prepare summary sheets in accordance with *UDOT Plan Sheet Development Standards* and *Summary Sheet CADD Standards*.
    - General Plan Sheet Requirements (Department or Region)
    - Summary Sheet Requirements
- Use UDOT Excel spreadsheets and customize for the project.
    - Include all roadway related pay items and necessary non-pay items.
    - Include names, alignment designations, stations, offsets, units, and quantities.
    - Show enough detail to support calculations.
- Use UDOT standard summary plan sheets.
    - Export all summaries from Excel to Microstation.

Finalize Drainage/Irrigation Cost Estimate

- Update drainage and irrigation bid items and quantities.
- Update drainage and irrigation unit costs (see 2Q1).

Enter Drainage/Irrigation Estimate in PDBS

Prepare Drainage and Irrigation Project Documents

- Provide all special provisions required for project construction.
  - General Special Provisions
  - Project Specific Special Provisions
  - Use *Specification Writer's Guide*.
- Use PDBS to generate M&P for all bid items.
  - Develop M&P for all non-standard bid items.
  - Use the current *Measurement and Payment Template*.
  - Include accurate description for all effort and materials required for construction.
  - M&P pay items must match plan sheet pay items exactly.
- Use PDBS to generate A&D for all standard pay items.
  - Use the *Acceptance and Documentation Guide*.
  - Coordinate with the RE to develop A&D for non-standard items.

Prepare Drainage Report

Prepare Drainage report and include necessary drainage elements and data for the project.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

1R1 Develop Roadway Scope

(back to table)

Overview

Determine the preliminary project footprint.

References

- ☐ AASHTO, A Policy on Geometric Design of Highways and Streets
- ☐ UDOT Roadway Design Manual of Instruction
- ☐ 13 Critical Elements
- ☐ UDOT Additional Design Criteria
- ☐ Project Development Business System
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary Footprint Review Drawing
- ☐ Preliminary Roadway Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader

Deliverable	Task	Responsible Party Activity Leader Roadway Designer
Preliminary Footprint Review Drawing	▪ Assess Existing Conditions	X
	▪ Develop Strategy to Address Deficiencies	X
	▪ Review Multi-Modal Needs	X
	▪ Develop Preliminary Typical Section	X
	▪ Determine Preliminary Project Footprint	X
	▪ Prepare Preliminary Project Footprint Review Drawing	X
Preliminary Roadway Cost Estimate	▪ Develop Preliminary Roadway Cost Estimate	X
QC Cover Sheets	▪ Initiate QC Review	X

Assess Existing Conditions

- Conduct a field review to assess existing roadway conditions.
- Obtain as-built information.
- Request and obtain an Operational Safety Report (OSR) and identify safety needs.
- Meet with maintenance onsite and identify existing deficiencies.
    - Geometric
    - Signing
    - Striping
    - Safety
    - Drainage

Develop Strategy to Address Deficiencies

- Identify roadway related deficiencies.
- Identify improvements to correct deficiencies.

Review Multi-Modal Needs

Review the Bicycle and Pedestrian Accommodations Form completed during concept.

- If no concept was completed, coordinate with Bicycle and Pedestrian Coordinator to do the following:
    - Consider multi-modal needs.
    - Review Master Plans.
    - Coordinate with local municipalities and UTA as needed.
    - Develop cost estimate for proposed improvements.

Develop Preliminary Typical Section

Develop preliminary typical section to identify the roadway footprint.

- Conform to the PDC.
- Show the existing and proposed roadway width.

Determine Preliminary Project Footprint

Following the PDC and project concept, do the following:

- Determine Preliminary Project Footprint.
    - Use the concept report, existing conditions, and preliminary project scope.
    - Use the preliminary typical section(s) to determine preliminary estimated cut/fill lines (e.g. Offset 20 feet from preliminary edge of pavement).
- Coordinate with the following disciplines to identify potential impacts.
    - Environmental
    - Right-of-Way
    - Hydraulics
    - Structures
    - Utilities

  - Traffic and Safety
- If possible, develop preliminary horizontal and vertical alignments of main and secondary roads.
- Follow design standards (See 2R1 for more information).

Prepare Preliminary Project Footprint Review Drawing

Prepare drawing in the format(s) determined by the Project Manager showing the preliminary roadway footprint.

- Include the proposed preliminary project footprint.
- Include known existing topography.
- Include known ROW and easements (existing and proposed).
- Include available preliminary horizontal and vertical alignments.
- Include additional relevant information to facilitate reviews.
- Label items necessary for clarity or to highlight for discussion.

Develop Preliminary Roadway Cost Estimate

- Compile initial roadway bid items and quantities.
  - Use UDOT standard bid items.
- Develop unit costs for each item.
  - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.).
  - Document unit cost development, assumptions, etc.
  - Account for project specific factors (see below).
- Use lump sum pricing only when appropriate.
  - Consider contractor risk due to unknown quantity.
  - Consider difficulty in pricing per unit.
  - Consider all materials and labor involved.

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Time of year	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Specialty equipment	Constructability

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

2R1 Model Initial Roadway Design

(back to table)

Overview

Determine the recommended horizontal and vertical alignments by developing the initial roadway model.

References

- ☐ AASHTO, A Policy on Geometric Design of Highways and Streets
- ☐ UDOT Roadway Design Manual of Instruction
- ☐ AASHTO Roadside Design Guide
- ☐ 13 Critical Elements
- ☐ UDOT Additional Design Criteria
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ Design Exception, Design Waivers, and Deviation from Standards Forms
- ☐ Project Development Business System
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Roadway Comment Resolutions
- ☐ Recommended Alignments Review Drawing
- ☐ Design Exceptions, Design Waivers, and Deviation from Standards Forms (if necessary)
- ☐ Roadway Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Region Preconstruction Engineer

Deliverables	Task	Responsible Party Activity Leader Roadway Designer
Roadway Comment Resolutions	▪ Address Review Comments	X
Recommended Alignments Review Drawing	▪ Determine Recommended Horizontal and Vertical Alignments	X
	▪ Develop Initial Roadway Model	X
	▪ Analyze Roadway Design	X
	▪ Prepare Recommended Alignments Review Drawing	X
Design Exceptions, Design Waivers, and Deviation from Standards Forms	▪ Submit Design Exceptions, Design Waivers, and Deviation from Standards Forms	X
Roadway Cost Estimate	▪ Update Roadway Cost Estimate	X
QC Cover Sheets	▪ Initiate QC Review	X

Address Review Comments

Address all roadway related comments. See *UDOT QC/QA Procedures* for more information about completing the comment resolutions. Revise the design based on comments resolutions.

Determine Recommended Horizontal and Vertical Alignments

Determine the recommended horizontal and vertical alignments based on discussions with reviewers, input from other disciplines, and the initial roadway model. The final horizontal and vertical alignments design is iterative and may require multiple revisions during the development of the roadway model. To determine the horizontal and vertical alignments, do the following:

- Coordinate with the following disciplines to determine potential conflicts, deficiencies, and impacts.
  - Environmental
  - Right-of-Way
  - Hydraulics
  - Structures
  - Utilities
  - Traffic and Safety
- Conform to horizontal alignment design standards.
  - Adhere to 13 Critical Elements
  - Adhere to UDOT Additional Design Criteria
  - GB Chapter 3
  - Minimum radius requirements
  - Roadway Design Manual of Instruction Section 7

  - Stationing goes from south to north or west to east and reads left to right.
  - For an alignment that follows an existing alignment, the new alignment is based off ROW markers or common tie points between the existing alignment and the proposed alignment.
- Conform to vertical alignment design standards.
  - Adhere to the Roadway Design Manual of Instruction Section 7
  - Adhere to hydraulic requirements
  - Minimum length of vertical curve ($L_{min} = 3V$)
  - Adhere to UDOT minimum slope (0.3%, 0.5% preferred)
  - Adhere to minimum K values ($K > K_{min}$; $Ksag < 167$)
  - Consult with Region Hydraulics Engineer on all possible trouble locations

Develop Initial Roadway Model

- Develop templates to represent specific project circumstances. These should include, but are not limited to, the following:
  - Number of lanes and width
  - Superelevations
  - Turn bays (based on assumed lengths)
  - Shoulders and bike lanes
  - Curb and gutter
  - Sidewalks and park strips
  - Sideslope treatments
    - Clear zones
    - Retaining walls
- Develop the roadway model based on templates.
  - Create design surfaces
  - Identify preliminary cut/fill lines
    - Identify potential ROW impacts
    - Identify potential utility impacts
- Evaluate initial cross sections.
- Calculate preliminary earthwork.
- As necessary, modify the model based on input from other disciplines.
- Develop the model to a level at which the horizontal and vertical alignments can be established to reduce risk to other disciplines' design work.
- Produce a clean version of the roadway design in MicroStation.

Analyze Roadway Design

- Compliance with the PDC.
  - Identify additional design exceptions and waivers.
- Surface drainage
  - Coordinate with drainage design.
  - Reverse superelevations
  - Analyze flat spots.

- Feasibility of driveway connections
- Traffic signal sight distance
- Material availability identification
    - Identify commercial material sources.
    - Identify state-owned pits.
    - Investigate quality of material from the possible materials sources (If applicable).
    - Identify clearances necessary to use the possible materials sources (If applicable).

Prepare Recommended Alignments Review Drawing

The review drawing provides reviewers with the initial roadway design, specifically the recommended horizontal and vertical alignments. Prepare the drawing in the format requested by reviewers and a format appropriate for the Geometry Review Meeting. Provide the review drawing to the Design Leader for distribution to all reviewers.

Only information required for a review of the recommended alignments and initial roadway design is recommended at this time. Consider the following information for inclusion on the review drawing.

- For roadway plan view:
    - Show existing topography in proper grayscale.
    - Label existing features as needed for clarity.
    - Include all street names.
    - Include north arrow and scale.
    - Include proposed horizontal alignments and annotation.
    - Show preliminary cut/full lines.
    - Show known existing and proposed ROW.
    - Label and clarify all geometric design information.
    - Consider striping sheets to show lane widths, etc.
- For roadway profile view:
    - Proposed vertical alignments and annotation.
    - Existing ground.
    - Existing and proposed elevations profile grid.
    - Intersected streets, railroads, grade-separated structures, culverts, streams, etc.

Submit Design Exceptions, Design Waivers, and Deviation from Standards Forms

Complete and submit design exception, design waivers, and deviation from standards forms. Work with the Region Preconstruction Engineer to obtain approvals.

Update Roadway Cost Estimate

- Update roadway bid items and quantities.
- Update roadway unit costs (see 1R1).

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

3R1 Complete Roadway Design

(back to table)

Overview

Finalize the roadway model and design. Modify the design based on reviewer comments and continued coordination with project team members. Modify the design as necessary to include other discipline needs like drainage facilities, utilities, signal, signs, and ATMS. Create preliminary roadway plan sheets.

References

- ☐ AASHTO, A Policy on Geometric Design of Highways and Streets
- ☐ UDOT Roadway Design Manual of Instruction
- ☐ AASHTO Roadside Design Guide
- ☐ 13 Critical Elements
- ☐ UDOT Additional Design Criteria
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ Design Exception, Design Waivers, and Deviation from Standards Forms
- ☐ (PDBS) Project Development Business System
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Roadway Comment Resolutions
- ☐ Preliminary Roadway Plan and Profile Sheets
- ☐ Preliminary Typical Section Plan Sheets
- ☐ Design Exceptions, Waivers, and Deviation from Standards Forms (if necessary)
- ☐ Roadway Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Region Preconstruction Engineer

Project Delivery Network

Deliverable	Task	Responsible Party Activity Leader Roadway Designer
Roadway Comment Resolutions	▪ Address Review Comments	X
Preliminary Roadway Plan Sheets	▪ Coordinate with Project Team Members	X
	▪ Complete Roadway Design	X
	▪ Develop Preliminary Roadway Plan and Profile Sheets	X
Preliminary Typical Section Plan Sheets	▪ Develop Preliminary Typical Section Plan Sheets	X
Design Exception, Design Waivers, and Deviation from Standards Forms	▪ Submit Design Exceptions, Design Waivers, and Deviation from Standards Forms for Approval	X
Roadway Cost Estimate	▪ Update Roadway Cost Estimate	X
QC Cover Sheets	▪ Initiate QC Review	X

Address Review Comments

Address all roadway related comments. See *UDOT QC/QA Procedures* for more information about completing comment resolutions. Revise the design based on comments resolutions.

Coordinate with Project Team Members

Continually coordinate with project team members. Discuss aspects of the model and design with appropriate disciplines to ensure compliance with standards, with other designs, and address fatal flaws. Coordinate and mitigate project design conflicts, impacts, and deficiencies.

Complete Roadway Design

Refer to AASHTO and UDOT design standards to finalize the roadway design.

- Finalize templates including, but not limited to, the following:
  - Pavement section
  - Superelevation
  - Transitions
    - Gore areas
    - Lane widening
- Finalize the roadway model based on templates.
  - Grading
    - Accommodate guardrail/barrier
    - Driveways/approaches
    - Curb returns
    - Cross streets

        - Accommodate drainage
        - Overhead sign locations
        - Retaining walls
        - Major and minor structures
    - Create design surfaces.
    - Evaluate the cut/fill lines.
        - Identify any additional ROW, utility, and other impacts.
- Design miscellaneous features including, but not limited to, the following:
    - Maintenance access
    - Geotechnical instrumentation accommodations
    - Driveways
    - Fences
    - Fire hydrants
    - Flatwork
    - Mailboxes
    - Pedestrian access ramps
    - Raised islands
    - Removals
    - Trails
- Evaluate clear zone hazards and appropriate protection devices.
    - Design guardrail/barrier.
- Consider construction phasing and limitations.
- Produce a clean version of the roadway design in MicroStation.
    - Roadway file
    - Typical sections
    - Profiles
    - Superelevation diagrams
- Calculate quantities.

Develop Preliminary Roadway Plan and Profile Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to develop roadway plan and profile sheets for review. These sheets are to provide a review of the final roadway design. It is recommend that only the information required for final roadway design review be placed on the sheets at this time. Verify with the project manager the expected level of effort for the review submittal. QC review is required before distribution for all labels, callouts, notes, and information found on the plan sheets.

- For all plan sheets, do the following:
    - Follow the UDOT Plan Sheet Development Standards for General Plan Sheet Requirements when generating plan sheets, drafting, referencing, and callouts
    - Provide all information needed for review (i.e. type of curb and gutter, cut/fill lines, alignment annotation, etc.)
    - Label all streets and important existing features
    - Ensure all existing features are displayed in proper grayscale

- For roadway plan sheets, do the following:
  - Include all roadway design and roadway related features (cut/fill, ROW, etc.)
  - Annotate all alignments
  - Label all new roadway work items, including miscellaneous design features listed above, overhead sign locations, guard rails/barrier, retaining walls, and other important design features (i.e. type of curb and gutter, curb radius, etc.)
- For roadway profile sheets, do the following:
  - Follow the UDOT Plan Sheet Development Standards for Roadway Profile Sheet Requirements
    - Superelevation
    - Label transition point station and rate
    - Show and label the existing ground

Develop Preliminary Typical Section Plan Sheets

Create typical section plan sheets and include all typical sections. Use the following to develop the preliminary typical section plan sheets:

- General Plan Sheet Requirements
- Typical Sections Sheet Requirements
- Label all typical section features
- Label each typical section start and end station
- Include all necessary notes, callouts, dimensions, symbols, etc.
- Make sure all symbols and line styles are identifiable

Submit Design Exceptions, Waivers, and Deviation from Standards for Approval

Complete and submit design exception, design waivers, and deviation from standards forms. Work with the Region Preconstruction Engineer to obtain approvals.

Update Roadway Estimate

- Update roadway bid items and quantities
- Update roadway unit costs (see 1R1)

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

3R2 Complete Signing and Striping Design

(back to table)

Overview

Using the roadway model as a guide, develop the signing and striping design for the project. Locate appropriate sites for placement of overhead sign structures (if applicable). Develop maintenance-of-traffic (MOT) design. Develop preliminary signing, striping, and MOT plan sheets.

References

- ☐ Manual on Uniform Traffic Control Devices
- ☐ UDOT Sign Manual
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT Roadway Design Manual of Instruction
- ☐ AASHTO Roadside Design Guide
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ Project Development Business System
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary Signing and Striping Plan Sheets
- ☐ Overhead Sign Locations (as necessary)
- ☐ Preliminary MOT Plan Sheets
- ☐ Signing, Striping, and MOT Cost Estimates
- ☐ QC Cover Sheets
- ☐ Region and State Approvals (as necessary)

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Lighting Designer
- ☐ Traffic and Safety Engineer
- ☐ Region Traffic Engineer
- ☐ Central Traffic Engineer

Deliverable	Task	Responsible Party	
		Activity Leader	
		Roadway Designer	Traffic Designer
Preliminary Signing and Striping Plan Sheets	▪ Develop Signing and Striping Design		X
	▪ Create Preliminary Signing and Striping Plan Sheets		X
Overhead Sign Locations	▪ Identify Overhead Sign Locations		X
	▪ Determine Cantilever or Full Span		X
	▪ Produce Cross-Section to Determine Vertical Clearance		X
	▪ Determine Barrier Needs/Foundation Protection		X
	▪ Determine Power Requirements for Lighting the Overhead Sign		X
Preliminary MOT Plan Sheets	▪ Complete MOT Design		X
	▪ Obtain Closure Approvals (if necessary)		
	▪ Create Preliminary MOT Plan Sheets		X
Signing, Striping, and MOT Cost Estimate	▪ Develop Signing, Striping, and MOT Cost Estimate		X
QC Cover Sheets	▪ Initiate QC Review		X
Region and State Approvals	▪ Obtain Region and State Approvals		X

Develop Signing and Striping Design

Using UDOT Standard Drawings as well as the Federal Highway Administration (FHWA) and UDOT approved *Manual of Uniform Traffic Control Devices* (MUTCD) as references, develop signing and striping design.

For signing design, do the following:

- Coordinate with the Region Traffic Engineer for approval of interstate guide signs by the State Traffic and Safety Division
- Review for compliance with MUTCD
- Consider signs that may be required outside of the project limits
- Replace, modify, or upgrade existing signs where necessary

For striping design, do the following:

- Base the striping plan on capacity analysis
- Design lane widths and intersection layouts from previous phases
- Note pavement marking type

Create Preliminary Signing and Striping Plan Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to create signing and striping plan sheets for review. These sheets are to provide a review of the final signing and striping design. It is recommend that only the information required for final signing and striping design review be placed on the sheets at this time. Verify with the project manager the expected level of effort for the review submittal. QC review is required before distribution for all labels, callouts, notes, and information found on the plan sheets.

- For all plan sheets, do the following:
  - Follow the UDOT Plan Sheet Development Standards for General Plan Sheet Requirements for sheet generation, drafting, referencing, and callouts
  - Provide all information needed for review
  - Include the street names
  - Show the proposed design without cut/fill lines
  - Show the new alignment, stationing, and curve data
  - Ensure all existing features are displayed in proper grayscale
- For striping plan sheets, do the following:
  - Label pavement marking type
- For signing plan sheets, do the following:
  - Correctly call out the proposed sign locations.
- For Overhead Sign Locations
  - Show on roadway plan sheets and signing and striping plan sheets
  - Correctly call out the proposed foundation locations on Roadway Plan Sheets

Indentify Overhead Sign Locations (if applicable)

Refer to the *MUTCD* and *UDOT Sign Manual* to determine the locations of overhead sign needs.

Determine Cantilever or Full Span (if applicable)

Determine the placement and type of structure based on recommendations from the structural design engineer and the Structures Division requirements found in the *Structures Design and Detailing Manual*.

Produce Cross-Section to Determine Vertical Clearance (if applicable)

Provide vertical clearances in accordance with the Structures Division requirements. These requirements can be found in the *Structures Design and Detailing Manual*.

Determine Barrier Needs/Foundation Protection (if applicable)

Evaluate the clear zone requirements and need for barriers and/or foundation protections.

Determine Power Requirements for Lighting the Overhead Sign (if applicable)

Determine the lighting and power needs for overhead signs and coordinate with the Lighting Designer (3R3).

Complete MOT Design

Using resources that include the *UDOT Standard Drawings TC series*, FHWA, MUTCD, and the Work Zone Safety and Mobility Policy UDOT 08-5, develop the MOT design. Consider the following:

- Coordinate the detour routes with stakeholders to minimize impacts. These stakeholders could include state agencies, local agencies, property owners, and the traveling public.
- Coordinate with the Design Leader to determine user costs.
- Evaluate the detour alternatives.
- Review the preferred alternatives with the Region Traffic Engineer.
- Design project specific custom signs, including dimensions, color, message, and letter size.
- Determine the VMS sign placement and proposed message.
- Design the static information sign.
- Consider the overhead VMS and HAR radio sites.
- Consider the need to model traffic impacts due to traffic pattern modifications.
- Coordinate signal timing adjustments with the TOC.
- If closures are required, do the following:
    - Develop the detour plan for each closure
    - Place VMS in each direction seven days prior to the closure
    - Get approval from the Region Operations Engineer and Region Director

Obtain Closure Approvals (if necessary)

Initiate and obtain approval from local agencies or FHWA when applicable.

Create Preliminary MOT Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to create preliminary MOT plan sheets for review. These sheets are to provide a review of the preliminary MOT layout. It is recommend that only the information required for the review be placed on the sheets at this time. Verify with the project manager the expected level of effort for the review submittal. QC review of all labels, callouts, notes, and information found on the plan sheets is required before distribution.

- Follow the UDOT Plan Sheet Development Standards for general plan sheet requirements for sheet generation, drafting, referencing, and callouts
- Include the street names
- Show the MOT design
- Label/call out all necessary items

Develop Signing, Striping, and MOT Cost Estimate

Refer to the R-MOI Estimating section.

- Develop signing and striping bid items and quantities
- Coordinate with the Structural Engineer to develop overhead sign structure bid items and quantities
    - Use UDOT standard bid items
- Develop unit costs for each item

- Use appropriate resources for developing unit costs (PDBS, local contractors, etc.)
- Document unit cost development, assumptions, etc.
- Account for project specific factors (see below)

- Use lump sum pricing only when appropriate
  - Consider contractor risk due to unknown quantity
  - Consider difficulty in pricing per unit
  - Consider all materials and labor involved

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Time of year	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Specialty equipment	Constructability

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

Obtain State and Region Approval

Submit review materials to the Region Traffic Engineer and Central Traffic Engineer. Address comments as necessary to obtain design approval.

3R3 Complete Signal and Lighting Layout Designs

(back to table)

Overview

Complete the signal layout design according to the *UDOT Design of Signalized Intersections Manual*. Create preliminary signal plan sheets. Develop the lighting design according to the *AASHTO Roadway Lighting Design Guide*. Create preliminary plan sheets.

References

- ☐ UDOT Design of Signalized Intersections Manual
- ☐ AASHTO Roadway Lighting Design Guide
- ☐ UDOT Roadway Design Manual of Instruction
- ☐ AASHTO Roadside Design Guide
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ Project Development Business System
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary Signal Plan Sheets
- ☐ Preliminary Lighting Plan Sheets
- ☐ Cooperative Agreements (if applicable)
- ☐ Request for ROW
- ☐ Signal Cost Estimate
- ☐ Lighting Cost Estimate
- ☐ QC Cover Sheets
- ☐ Design Acceptance

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Region Traffic and Safety Engineer
- ☐ Central Traffic and Safety

Project Delivery Network

Deliverable	Task	Responsible Party		
		Activity Leader: Roadway Designer	Signal Designer	Lighting Designer
Preliminary Signal Plan Sheets	▪ Identify Signal Requirements		X	
	▪ Layout Signal Design		X	
	▪ Create Preliminary Signal Plan Sheets		X	
Preliminary Lighting Layout Plan Sheets	▪ Identify Lighting Requirements			X
	▪ Layout Lighting Design			X
	▪ Create Preliminary Lighting Plan Sheets			X
Cooperative Agreements	▪ Assist PM Develop Cooperative Agreements		X	X
Request for ROW	▪ Request Additional ROW (if needed)		X	X
Signal and/or Lighting Cost Estimate	▪ Develop Signal Cost Estimate		X	
	▪ Develop Lighting Cost Estimate			X
QC Cover Sheets	▪ Initiate QC Review		X	X
Design Acceptance	▪ Obtain Signal Design Acceptance		X	
	▪ Obtain Lighting Design Acceptance			X

Identify Signal Requirements

- Avoid conflicts by coordinating with other disciplines, including utility, roadway, drainage, and signing and striping.
- Identify signal phasing based on the capacity analysis and warrant study.
- Identify the sight distance concerns and coordinate with other disciplines.
- Coordinate ATMS needs with the TOC.
- Ensure the Americans with Disabilities Act (ADA) accessibility requirements are addressed.
- Coordinate power source needs and impacts with the local utilities.

Layout Signal Design

Develop the signal design according to the *UDOT Design of Signalized Intersections Manual*.

Create Preliminary Signal Plan Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to create preliminary signal plan sheets for review. These sheets are to provide a review of the preliminary signal layout. It is recommend that only the information required for the review be placed on the sheets at this time. QC review of all labels, callouts, notes, and information found on the plan sheets is required before distribution.

- Follow the UDOT Plan Sheet Development Standards for general plan sheet requirements for sheet generation, drafting, referencing, and callouts.
- Include the street names.
- Show the preliminary signal layout.
- Call out signal head types.
- Provide all information needed to review the design.

Identify Lighting Requirements

- Determine the lighting type required by UDOT and/or the local jurisdiction.
- Determine luminaire spacing. Verify illumination through AGI32 lighting software.
- Identify the ROW needs.
- Determine power source needs and impacts with the local utilities.

Layout Lighting Design

Develop the lighting design according to the *AASHTO Roadway Lighting Design Guide*.

Create Preliminary Lighting Plan Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to create preliminary lighting plan sheets for review. These sheets are to provide a review of the preliminary lighting layout. It is recommend that only the information required for the review be placed on the sheets at this time. Verify with the project manager the expected level of effort for the review submittal. QC review of all labels, callouts, notes, and information found on the plan sheets is required before distribution.

- Follow the UDOT Plan Sheet Development Standards for general plan sheet requirements for sheet generation, drafting, referencing, and callouts.
- Include the street names.
- Show the lighting layout.
- Provide all information needed to review the design.

Assist PM Develop Cooperative Agreement

Assist the PM in developing a cooperative agreement with the local jurisdiction. Refer to Policy and Procedure 06C-06 for maintenance and power cost responsibilities.

Request Additional ROW (if needed)

Identify the ROW needs and coordinate with the ROW team.

Develop Signal and Lighting Estimate

Refer to the R-MOI Estimating section.

- Develop signal bid items and quantities.
  - Use UDOT standard bid items.
- Identify State Furnished and Contractor Furnished bid items.

- Identify betterment bid items.
- Develop unit costs for each item.
  - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.).
  - Document unit cost development, assumptions, etc.
  - Account for project specific factors (see below).
- Use lump sum pricing only when appropriate.
  - Consider contractor risk due to unknown quantity.
  - Consider difficulty in pricing per unit.
  - Consider all materials and labor involved.

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Time of year	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Specialty equipment	Constructability

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

Obtain Signal and/or Lighting Design Acceptance

Send the signal and/or lighting designs to the Region Traffic and Safety Engineer for review. Submit to Central Traffic and Safety for review and comment.

4R1 Complete Roadway Plans & Documents

(back to table)

Overview

Following *UDOT Plan Sheet Development Standards*, complete the roadway plan and profile sheets and create roadway plan summaries, details, and additional plan sheets. Prepare and assemble roadway project documents. Finalize roadway cost estimate.

References

- ☐ AASHTO, A Policy on Geometric Design of Highways and Streets
- ☐ UDOT Roadway Design Manual of Instruction
- ☐ AASHTO Roadside Design Guide
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Standard and Supplemental Specifications
- ☐ Specification Writer's Guide
- ☐ Measurement and Payment Template
- ☐ Acceptance and Documentation Guide
- ☐ Project Development Business System
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Roadway Comment Resolutions
- ☐ Roadway Plan and Profile Sheets
- ☐ Roadway Project Documents
- ☐ Roadway Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ Design Leader
- ☐ ProjectWise

Deliverable	Task	Responsible Party Activity Leader Roadway Designer
Roadway Comment Resolutions	▪ Address Review Comments	X
Roadway Plan and Profile Sheets	▪ Finalize Roadway Design	X
	▪ Complete Roadway Plan and Profile Sheets	X
	▪ Finalize Typical Section Plan Sheets	X
	▪ Complete Roadway Detail Plan Sheets	X
	▪ Complete Grading Plan Sheets	X
	▪ Complete Roadway Summary Sheets	X
Roadway Cost Estimate	▪ Finalize Roadway Cost Estimate	X
	▪ Enter Roadway Cost Estimate into PDBS	X
Roadway Project Documents	▪ Develop Roadway Project Documents	X
QC Cover Sheets	▪ Initiate QC Review	X

Address Review Comments

Address all roadway related comments. See *UDOT QC/QA Procedures* for more information about completing comment resolutions. Revise the design based on comments resolutions.

Finalize Roadway Design

Finalize the roadway design based on review comments and coordination with team members. Refer to 3R1 as needed.

Complete Roadway Plan and Profile Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to complete the roadway plan and profile sheets.

- For all plans sheets, do the following:
  - Follow the UDOT Plan Sheet Development Standards for General Plan Sheet. Requirements for generating plan sheets, drafting, referencing, and callouts.
  - Provide all necessary information.
- For roadway plan sheets, do the following:
  - Revise/update information labeled in previous review submittals as necessary.
  - Follow the UDOT Plan Sheet Development Standards for Roadway Plan Sheet Requirements.
  - Include all quantities and start/end stations.
  - Verify that the callouts are correctly placed and labeled.
- For roadway profile sheets, do the following:

- Revise/update information as needed.
- Follow the UDOT Plan Sheet Development Standards for Roadway Profile Sheet Requirements.
    - Superelevation
    - Label transition point station and rate.
    - Show and label the existing ground.

Complete Typical Section Plan Sheets

Finalize all typical sections and complete the plan sheets. Revise typical sections as needed based on review comments and roadway design revisions.

Complete Roadway Detail Plan Sheets

- Complete all details necessary for construction of the project.
    - Conform to UDOT Standards.
- Prepare detail plan sheets.
    - General Plan Sheet Requirements
    - Detail Sheet Requirements
    - Include all necessary notes, callouts, dimensions, symbols, etc.
    - Use identifiable symbols and line styles.

Complete Grading Plan Sheets

- Complete grading design necessary for construction of the project.
    - Conform to UDOT Standards.
- Prepare grading plan sheets.
    - General Plan Sheet Requirements
    - Grading Sheet Requirements
    - Include all necessary notes, callouts, dimensions, symbols, etc.
    - Use identifiable symbols and line styles.

Complete Roadway Summary Sheets

- Prepare summary sheets in accordance with *UDOT Plan Sheet Development Standards* and *Summary Sheet CADD Standards*.
    - General Plan Sheet Requirements (Department or Region).
    - Summary Sheet Requirements
- Use UDOT Excel spreadsheets and customize for the project.
    - Include all roadway related pay items and necessary non-pay items.
    - Include names, alignment designations, stations, offsets, units, and quantities.
    - Show enough detail to support calculations.
- Use UDOT standard summary plan sheets.
    - Export all summaries from Excel to Microstation.

Finalize Roadway Cost Estimate

- Update roadway bid items and quantities.

- Update roadway bid items and quantities.
- Update roadway unit prices (see 1R1).

Upload Roadway Estimate to PDBS

Develop Roadway Project Documents

- Provide all special provisions required for project construction.
  - General Special Provisions.
  - Project Specific Special Provisions.
  - Use *Specification Writer's Guide*.
- Generate M&P for all bid items.
  - Develop M&P for all non-standard bid items.
  - Use the current *Measurement and Payment Template*.
  - Include accurate description for all effort and materials required for construction.
  - M&P pay items must match plan sheet pay items exactly.
- Generate A&D for all standard pay items.
  - Use the Acceptance and Documentation Guide.
  - Coordinate with the RE to develop A&D for non-standard items.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

4R2 Complete Signing and Striping Plans & Documents (back to table)

Overview

Following *UDOT CADD and Plan Sheet Standards*, finalize the signing and striping plan set and create summary sheets. Finalize the maintenance-of-traffic (MOT) design and plans. Prepare and assemble the signing, striping, and MOT project documents, including measurement and payment, special provisions, acceptance and documentation, and final cost estimate.

References

- ☐ (MUTCD) Manual on Uniform Traffic Control Devices
- ☐ AASHTO, A Policy on Geometric Design of Highways and Streets
- ☐ UDOT Roadway Design Manual of Instruction
- ☐ AASHTO Roadside Design Guide
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Standard and Supplemental Specifications
- ☐ UDOT Plan Sheet Development Standards
- ☐ Specification Writer's Guide
- ☐ Measurement and Payment Template
- ☐ Acceptance and Documentation Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Signing, Striping, MOT Comment Resolutions
- ☐ Signing and Striping Plan Sheets
- ☐ MOT Plan Sheets
- ☐ Signing, Striping, and MOT Cost Estimate
- ☐ Signing, Striping, and MOT Project Documents
- ☐ QC Cover Sheets
- ☐ Overhead Sign Approval

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Region Traffic and Safety Engineer
- ☐ Central Traffic and Safety

Deliverable	Task	Responsible Party	
		Activity Leader: Roadway Designer	Traffic Designer
Signing, Striping, MOT Comment Resolutions	▪ Address Review Comments		X
Signing and Striping Plan Sheets	▪ Design Overhead Sign Layout		X
	▪ Finalize Signing and Striping Design		X
	▪ Complete Signing and Striping Plan Sheets		X
	▪ Complete Signing and Striping Detail Plan Sheets		X
	▪ Complete Signing and Striping Summary Sheets		X
MOT Plan Sheets	▪ Finalize MOT Design		
	▪ Complete MOT Plan Sheets		X
Signing, Striping, and MOT Cost Estimate	▪ Finalize Signing, Striping, and MOT Cost Estimate		X
	▪ Enter Cost Estimate into PDBS		X
Signing, Striping, and MOT Project Documents	▪ Develop Signing, Striping, and MOT Project Documents		X
QC Cover Sheets	▪ Initiate QC Review		X
Overhead Sign Approval	▪ Obtain Overhead Sign Approval		X

Address Review Comments

Address all signing, striping, and MOT related comments. See *UDOT QC/QA Procedures* for more information about completing comment resolutions. Revise the design based on comments resolutions.

Design Overhead Sign Layout (if necessary)

- Layout the sign message.
- Determine the lighting requirements.
- Submit the sign layout to the Traffic and Safety Division for approval.
- Coordinate with the Central Structures for sign structure design.
- Finalize electrical power needs for lighting and overhead signs.

Finalize Signing and Striping Design

Finalize the signing and striping design based on review comments and coordination with team members. Refer to 3R3 as needed.

Complete Signing and Striping Plan Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to finalize the plan sheets.

- Combine signing and striping plan sheets when possible.
- Update/revise all labels for items labeled in 3R2
- For **striping** plan sheets, do the following:
  - Follow the Striping Sheet Requirements
  - Callout all items necessary to construct
    - Lane widths
    - Taper locations
    - Taper widths
    - Striping types and sizes
    - Beginning and ending of all striping
- For **signing** plan sheets, do the following:
  - Follow the Signing Sheet Requirements
  - Callout all items necessary to construct
    - Callout existing sign removals and relocations
  - For each proposed sign
    - Pay item description
    - MUTCD code
    - Station and offset
    - Reference number
- Include all notes, legends, and title block information
- Verify that the callouts are correctly placed and labeled.

Complete Signing and Striping Detail Plan Sheets

- Complete all details necessary to construct signing and striping design
  - Conform to UDOT Standards
  - Include all overhead sign details
- Prepare detail plan sheets
  - General Plan Sheet Requirements
  - Detail Sheet Requirements
  - Include all necessary notes, callouts, dimensions, symbols, etc.
  - Use identifiable symbols and line styles

Complete Signing and Striping Summary Sheets

- Prepare summary sheets in accordance with *UDOT Plan Sheet Development Standards*
  - General Plan Sheet Requirements
  - Summary Sheet Requirements
- Use UDOT Excel spreadsheets and customize for the project.
  - Include all roadway related pay items and necessary non-pay items.
  - Include names, alignment designations, stations, offsets, units, and quantities.

    - Show enough detail to support calculations.
- Use UDOT standard summary plan sheets.
    - Export all summaries from Excel to Microstation.

Finalize MOT Design

Finalize the MOT design based on review comments and coordination with team members.

- Refer to 3R2 tasks as needed.
- Determine the detour signs, warning signs, and VMS required for MOT.
- Conform to all design standards including the *MUTCD, R-MOI,* and *UDOT Plan Sheet Development Standards – MOT Sheet Requirements.*

Complete MOT Plan Sheets

- Follow the *UDOT Plan Sheet Development Standards*.
    - General Plan Sheet Requirements
    - MOT Sheet Requirements
- Callout all bid items.
- Include all proposed MOT sign layouts.
- Include all necessary notes.

Finalize Signing, Striping, and MOT Cost Estimate

- Update signing, striping, and MOT bid items and quantities.
- Update the signing, striping, and MOT unit prices.

Enter Signing, Striping, and MOT Cost Estimate into PDBS

Develop Signing, Striping, and MOT Project Documents

- Provide all special provisions required for project construction.
    - General Special Provisions
    - Project Specific Special Provisions
    - Use *Specification Writer's Guide*.
- Generate M&P for all bid items.
    - Develop M&P for all non-standard bid items.
    - Use the current *Measurement and Payment Template*.
    - Include accurate description for all effort and materials required for construction.
    - M&P pay items must match plan sheet pay items exactly.
- Generate A&D for all standard pay items.
    - Use the Acceptance and Documentation Guide.
    - Coordinate with the RE to develop A&D for non-standard items.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

Obtain Overhead Sign Approval

Submit overhead sign layout to Central Traffic and Safety for approval. Make any revisions required and obtain final approval.

4R3 Complete Signal and Lighting Plans and Documents

(back to table)

Overview

Following *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* and using templates found on the UDOT Signal and Lighting Design website, complete the signal and lighting plan sheets.

References

- ☐ (MUTCD) Manual on Uniform Traffic Control Devices
- ☐ AASHTO Roadway Lighting Design Guide
- ☐ UDOT Roadway Design Manual of Instruction
- ☐ UDOT Signalized Intersection Design Guidelines
- ☐ Signal and Lighting Design Files
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Standard and Supplemental Specifications
- ☐ UDOT Plan Sheet Development Standards
- ☐ Specification Writer's Guide
- ☐ Measurement and Payment Template
- ☐ Acceptance and Documentation Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Signal and Lighting Comment Resolutions
- ☐ Signal Plan Sheets
- ☐ Lighting Plan Sheets
- ☐ Signal and Lighting Project Documents
- ☐ Signal and Lighting Cost Estimate
- ☐ QC Cover Sheets
- ☐ Signal and Lighting Design Approval

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Traffic Operations Center

Deliverable	Task	Responsible Party		
		Activity Leader: Roadway Designer	Signal Designer	Lighting Designer
Signal and Lighting Comment Resolutions	▪ Address Review Comments		X	X
Signal Plan Sheets	▪ Finalize Signal Layout Design		X	
	▪ Complete Signal Plan Sheets		X	
	▪ Complete Signal Circuit Design and Plan Sheets		X	
	▪ Complete Signal Schedule Sheets		X	
Lighting Plan Sheets	▪ Finalize Lighting Layout Design			X
	▪ Complete Lighting Plan Sheets			X
	▪ Complete Lighting Details and Plan Sheets			X
	▪ Complete Lighting Summary Sheets			X
Signal and Lighting Project Documents	▪ Develop Signal and/or LightingProject Documents		X	X
Signal and Lighting Cost Estimate	▪ Finalize Signal and/or Lighting Cost Estimate		X	X
	▪ Enter Signal and/or Lighting Estimate in PDBS		X	X
QC Cover Sheets	▪ Initiate QC Review		X	X
Signal and Lighting Design Approval	▪ Obtain Signal and/or Lighting Design Approval		X	X

Address Review Comments

Address all signal and lighting related comments. See *UDOT QC/QA Procedures* for more information about completing the comment resolutions. Revise the design based on comments resolutions.

Finalize Signal Layout Design

Finalize the signal layout design based on review comments and coordination with team members. Conform to the *UDOT Signalized Intersection Design Guidelines*. Refer to 3R3 tasks as needed.

Complete Signal Plan Sheets

Follow the current *UDOT Signalized Intersection Design Guidelines* and *UDOT Plan Sheet Development Standards* to complete the plan sheets.

- Callout items necessary for construction.
- Include proposed signs.

- Include pole schedule, signal signs, signal head types and placement, etc.
- Include all callouts, labels, and notes necessary to construct the signal design.

Complete Signal Circuit Design and Plan Sheets

Follow the current *UDOT Signalized Intersection Design Guidelines* to complete the signal circuit designs and plan sheets.

- Develop circuit designs necessary for construction of the project.
  - Detection Plans
  - Circuit Diagrams
    - Signal Circuits
    - Push Button Circuits
    - Lighting Circuits
    - Etc.
- Prepare circuit design plan sheets.
  - General Plan Sheet Requirements
  - Detail Sheet Requirements
  - Identify conduits, cables, schedules, etc.
  - Identify locations, alignments, etc.
  - Include all necessary notes, callouts, dimensions, symbols, etc.
  - Use identifiable symbols and line styles.

Complete Signal Schedule Sheets

- Use UDOT Excel spreadsheets and customize for the project.
- Use the *Signal and Lighting Design File* to develop the Signal Schedule Sheets.
  - General Plan Sheet Requirements
  - Signal Schedule Sheet Requirements
- Include all bid items, units, and quantities.
- Include names, alignment designations, stations, and offsets.
- Export all schedules from Excel to Microstation.

Finalize Lighting Layout Design

Finalize the lighting layout design based on review comments and coordination with team members. Coordinate with the signal design. Refer to 3R3 as needed.

Complete Lighting Plan Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to finalize the lighting plan sheets.

- Follow the UDOT Plan Sheet Development Standards General Plan Sheet Requirements.
- Callout all bid items.
- Include all notes necessary to construct the lighting design.

Complete Lighting Detail Plan Sheets

Conform to UDOT Standards to complete the lighting details and plan sheets.

- Develop details necessary for construction of the project.
- Prepare detail plan sheets.
  - General Plan Sheet Requirements
  - Detail Sheet Requirements
  - Include all necessary notes, callouts, dimensions, symbols, etc.
  - Make sure all symbols and line styles are identifiable.

Complete Lighting Schedule Sheets

- Use UDOT Excel spreadsheets and customize for the project (*Signal and Lighting Design Files*).
- Prepare schedule sheets in accordance with *UDOT Plan Sheet Development Standards*.
  - General Plan Sheet Requirements
  - Summary Sheet Requirements
- Include all bid items, units, and quantities.
- Include names, alignment designations, stations, and offsets.
- Export all schedules from Excel to Microstation.

Finalize Signing and/or Lighting Cost Estimate

- Update signal and/or lighting bid items and quantities.
- Complete the state furnished materials request form.
- Update signal and/or lighting unit prices.

Enter Signal and/or Lighting Cost Estimate into PDBS

Complete Signal and/or Lighting Project Documents

- Provide all special provisions required for project construction.
  - General Special Provisions
  - Project Specific Special Provisions
  - Use *Specification Writer's Guide*.
- Generate M&P for all bid items.
  - Develop M&P for all non-standard bid items.
  - Use the current *Measurement and Payment Template*.
  - Include accurate description for all effort and materials required for construction.
  - M&P pay items must match plan sheet pay items exactly.
- Generate A&D for all standard pay items.
  - Use the Acceptance and Documentation Guide.
  - Coordinate with the RE to develop A&D for non-standard items.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

Obtain Signal and/or Lighting Design Approval

Submit signal and lighting design to Traffic Operations Center for approval. Make any revisions required and obtain final approval.

This page intentionally left blank

1S1 Identify Preliminary Structure Type (Minor & Major) (back to table)

Overview

Review the existing conditions and determine the physical requirements for any new structures. Develop a range of alternative structure types to fulfill the requirements.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary Structure Type(s) Selection Report which includes the following:
  - Existing structure conditions summary
  - Location of work (i.e., the location of the new structure, box culvert, or wall)
  - Accelerated Bridge Construction (ABC) Decision Making Procedure document
  - Construction phasing and limitations
  - Preliminary quantities, unit costs, and construction cost estimate
- ☐ QC Cover Sheets

Distribution

- ☐ Roadway Designer (1R1)
- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager

Deliverable	Task	Responsible Party Activity Leader Structural Design Engineer
Preliminary Structure Type(s) Selection Report	▪ Review Available Existing Structures Information	X
	▪ Meet with UDOT Structures Project Manager	X
	▪ Evaluate Feasible Alternatives	X
	▪ Coordinate with Railroad (If Applicable)	X
QC Cover Sheets	▪ Initiate QC Review	X

Review Available Existing Structures Information

- ▪ Request as-built drawings

- Request for Structural Inventory & Appraisal Sheets (SI&A)
- Request for Structures Recommendations Report
- Assure that as-built drawings reflect the existing conditions (i.e., elements like all rehabs or widening are accounted for).

Meet with UDOT Structures Project Manager

- Perform a field inspection of the structure and document pertinent existing conditions.
- Review and confirm the current structure conditions.
- Review the recommended strategy and achieve concurrence on the work to be performed.

Evaluate Feasible Alternatives

- Complete Accelerated Bridge Design (ABC) Decision Making Procedure document.
- Evaluate possible traffic impacts and assess possible ABC techniques (incorporate user costs assessment).
- Determine if a structures design exception, design waiver or deviation is required.
- Identify items that may entail additional study, creative design approaches, etc.
- Determine the construction phasing and maintenance of traffic limitations.
- Develop preliminary aesthetic concepts in conjunction with the Aesthetics/Landscape group.
- Review commitments from the Environmental Document (if applicable).
- Review UPLAN or the applicable long range plan for the proposed location.
- Evaluate right-of-way requirements and easements.
- Coordinate with the involved disciplines for any special needs (relocations, etc.).
    - ATMS conduits
    - Utility accommodations
    - Sign panel attachments
- Develop an evaluation matrix for all alternatives.
- Provide analysis / reasoning for eliminating or advancing alternatives.
- Establish the initial structural quantities, unit costs and construction cost estimate.
- Provide cost estimates for all alternatives.

For a new major structure and/or widening, do the following:

- Identify any hydraulic considerations. (e.g., scour and channel migration)
- Identify the number of spans.
- Determine the preliminary span lengths.
- Determine the preliminary girder type.
    - Take into account the project schedule and material availability.
- Determine the preliminary structure depth.
- Determine the preliminary bent and abutment locations.
- Determine the preliminary abutment types.

For major structure rehabilitation, do the following:

- Determine the preliminary work items.
- Develop a rehabilitation strategy.

- Determine scour countermeasure needs. (if applicable)

For new minor structures and/or extensions, do the following:

- Determine the preliminary box culvert type and size.
- Determine the preliminary wall type, height, and length.
- Determine the preliminary headwall layout.

For minor structures rehabilitation, do the following:

- Determine the preliminary work items.
- Develop a rehabilitation strategy.

Coordinate with Railroad (if applicable)

Contact the railroad and coordinate project details. (if applicable)

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print and supporting documentation for the Preliminary Structure Type(s) Selection Report.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

3S1 Develop Type Selection Report (TSR) and Seismic Strategy Report (back to table)

Overview

Determine bridge layout and geometry for design. Finalize the Type Selection Report and develop the Preliminary Seismic Strategy Report.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ AASHTO Guide Specifications for LRFD Seismic Bridge Design
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Structures Design and Detailing Manual
- ☐ Type Selection Report Template
- ☐ Seismic Strategy Report Template
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Final Type Selection Report which includes the following:
  - Structure design criteria
  - Preliminary plan, elevation, and cross section
  - Preliminary cost estimate
- ☐ Preliminary Seismic Strategy Report
- ☐ QC Cover Sheets

Distribution

- ☐ Roadway Designer (3R1)
- ☐ 3S2, 3S3, 3S4, or 3S5
- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structure Project Manager
- ☐ Project Geotechnical Engineer
- ☐ Region Hydraulics Engineer (Draft Hydraulics/Scour Report) (If Applicable)
- ☐ Railroad Companies / Chief Railroad Engineer (If Applicable)
- ☐ Region Utility and Railroad Coordinator (If Applicable)

Deliverable	Task	Responsible Party	
		Activity Leader	
		Structural Design Engineer	Region Utility and Railroad Coordinator
Final Type Selection Report	▪ Develop Structure Design Criteria	X	
	▪ Develop Structure Cross-Section	X	
	▪ Develop Preliminary Layout and Finalize Type Selection Report	X	
	▪ Discuss Structure Type, Track Configurations, and Clearances with Railroad Companies (If Applicable)	X	
	▪ Develop Preliminary Structures Cost Estimate	X	
Preliminary Seismic Strategy Report	▪ Develop Preliminary Seismic Strategy Report	X	
QC Cover Sheets	▪ Initiate QC Review	X	

Develop Structure Design Criteria

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Develop Structure Cross-Section

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Develop Preliminary Layout and Finalize Type Selection Report

- Refer to the Structures Division Type Selection Report template for required information to include.
- Include advantages and disadvantages of the bridge types evaluated.
- Recommend structure type.

Discuss Structure Type, Track Configurations, and Clearances with Railroad Companies (If Applicable)

Where a railroad alignment crosses a bridge alignment, early coordination with the owner(s) of the railroad(s) is critical:

- Prepare the preliminary layout to show the existing track configuration and the spacing perpendicular to the tracks.
- Discuss requirements with respect to the following items (other items may apply):
  - Vertical and horizontal clearances
  - Corrected track separations and future tracks
  - Structure type
  - Crash walls

  - Fencing and understructure lighting
  - Construction phasing, shoring, soil stabilization, etc.
- Inform the railroad companies that they will have an opportunity for a final review of the complete plan set during final design. It is important that the railroads are kept informed in the earlier stages to avoid impacts to the project.

Develop Preliminary Structures Cost Estimate

- Include preliminary costs for the proposed structure and/or the repairs to the existing structure as applicable.
- Compile initial structures bid items and quantities.
  - Verify bid items match UDOT standard bid items exactly as much as possible.
- Develop unit costs for each item.
  - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.).
  - Document unit cost development, assumptions, etc.
  - Account for project specific factors (see below).
- Use lump sum pricing only when appropriate.
  - Consider contractor risk due to unknown quantity.
  - Consider difficulty in pricing per unit.
  - Consider all materials and labor involved.

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Time of year	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Specialty equipment	Constructability

Develop Preliminary Seismic Strategy Report

- Refer to the Structures Division Seismic Strategy Report template for required information to include.
- Describe the design strategy for resisting the design seismic event.
- Include descriptions of expected damage, locations of plastic hinging, the redistribution forces, the mobilization of backfills, and the functions of bearings, as appropriate.
- Evaluate need to retrofit existing structure (if applicable).

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

3S2 Develop Situation and Layout (S&L) for Minor Structures

(back to table)

Overview

Develop the S&L sheets for minor structures (box culverts, headwalls, etc.), fully coordinating with the roadway geometric and hydraulic requirements.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ AASHTO Guide Specifications for LRFD Seismic Bridge Design
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ S&L Sheets
- ☐ Initial Design Exception, Design Waiver or Deviation of UDOT Standards Form (If Applicable)
- ☐ QC Cover Sheets

Distribution

- ☐ Roadway Designer (3R1)
- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager (3S6)
- ☐ Project Geotechnical Engineer (3G1)
- ☐ Region Hydraulic Engineer (If Applicable)
- ☐ Railroad Companies / Chief Railroad Engineer (If Applicable)
- ☐ Region Utility and Railroad Coordinator (If Applicable)

Deliverable	Task	Responsible Party Activity Leader Structural Design Engineer
S&L Sheets	▪ Request Structure Number	X
	▪ Develop S&L Sheets	X
	▪ Provide Constructability Review	X
	▪ Submit S&L to Railroad (If Applicable)	X
Initial Design Exception, Design Waiver, or Deviation from UDOT Standards Form	▪ Prepare Initial Design Exception, Design Waiver or Deviation from UDOT Standards Form (If Applicable)	X
QC Cover Sheets	▪ Initiate QC Review	X

Request Structure Number

Submit a structure number request for a box culvert or structure number request for headwalls and other structures through the UDOT Structures Design and Bridge Operations website.

Develop S&L Sheets

- Develop S&L sheets.
- Consider the need for scour protection, rip rap, etc.
- Submit preliminary S&L sheets to Geotechnical Engineer. (if applicable)

Provide Constructability Review

Verify that the structure can be reasonably constructed and determine a plausible phasing scheme.

Submit S&L Sheets to Railroad (If Applicable)

- Submit the draft Situation and Layout (S&L) showing all the required railroad information.
- Include the required Railroad Information Sheet in the submittal.
- Submit the Overhead Submittal Checklist to the Railroad.
- Submit the Overhead Grade Separation Data Sheet to the Railroad.
- Inform the railroad companies that they will have an opportunity for a final review of the S&L during final design. However, consensus must be reached on overall geometry at this time. It is important that the railroads are kept informed in the earlier stages to avoid impacts to the project schedule.

Prepare Initial Design Exception, Design Waiver or Deviation from UDOT Standards Form (as applicable to Structures)

- Prepare initial design exception, design waiver or deviation of UDOT Standards form as it applies to structures.
- Submit for approval.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

3S3 Develop Situation and Layout (S&L) for Rehabilitation

(back to table)

Overview

Develop list of expected structural repair work items for the structure.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ AASHTO Guide Specifications for LRFD Seismic Bridge Design
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ S&L Sheets
- ☐ Existing Structure Plans (For Information Only)
- ☐ Initial Design Exception, Design Waiver or Deviation of UDOT Standards Form (If Applicable)
- ☐ QC Cover Sheets

Distribution

- ☐ Roadway Designer (3R1)
- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager (3S6)
- ☐ Project Geotechnical Engineer (3G1) (If Applicable)
- ☐ Railroad Companies / Chief Railroad Engineer (If Applicable)
- ☐ Region Utility and Railroad Coordinator (If Applicable)

Deliverable	Task	Responsible Party Activity Leader Structural Design Engineer
S&L Sheets	▪ Request Structure Number	X
	▪ Develop Repair Lists	X
	▪ Develop S&L Sheets	X
	▪ Review Work Items	X
	▪ Submit S&L to Railroad (If Applicable)	X
Initial Design Exception, Design Waver, or Deviation from UDOT Standards Form	▪ Prepare Initial Design Exception, Design Waiver or Deviation from UDOT Standards Form (If Applicable)	X
QC Cover Sheets	▪ Initiate QC Review	X

Request Structure Number

Submit a structure number request for rehabilitations to a major structure through the UDOT Structures Design and Bridge Operations website.

Develop Repair Lists

Create a list of required or desired structural repairs.

Develop S&L Sheets

- Develop S&L sheets.
- Generate a plan set with a general sketch of the structure to show anticipated repair work to facilitate general discussion and reviews. Include the existing plan sets for information only.

Review Work Items

Coordinate anticipated work items with project team.

Submit S&L Sheets to Railroad (If Applicable)

- Submit the draft Situation and Layout (S&L) showing all the required railroad information.
- Include the required Railroad Information Sheet in the submittal.
- Submit the Overhead Submittal Checklist to the Railroad.
- Submit the Overhead Grade Separation Data Sheet to the Railroad.
- Inform the railroad companies that they will have an opportunity for a final review of the S&L during final design. However, consensus must be reached on overall geometry at this time. It is important that the railroads are kept informed in the earlier stages to avoid impacts to the project schedule.

Prepare Initial Design Exception, Design Waiver or Deviation from UDOT Standards Form (as applicable to Structures)

- Prepare initial design exception, design waiver or deviation from UDOT Standards form as it applies to structures.
- Submit for approval.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

3S4 Develop Situation and Layout (S&L) for Retaining Walls

(back to table)

Overview

Develop the S&L sheets for each wall, fully coordinating with the roadway, grading, and geotechnical requirements.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ AASHTO Guide Specifications for LRFD Seismic Bridge Design
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ S&L Sheets
- ☐ QC Cover Sheets

Distribution

- ☐ Roadway Designer (3R1)
- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager (3S6)
- ☐ Project Geotechnical Engineer (3G1)
- ☐ Railroad Companies / Chief Railroad Engineer (If Applicable)
- ☐ Region Utility and Railroad Coordinator (If Applicable)

Deliverable	Task	Responsible Party Activity Leader Wall Design Engineer
S&L Sheets	▪ Request Structure Number	X
	▪ Develop S&L Sheets	X
	▪ Provide Constructability Review	X
	▪ Submit S&L to Railroad (If Applicable)	X
QC Cover Sheets	▪ Initiate QC Review	X

Request Structure Number

Submit a structure number request through the UDOT Structures Design and Bridge Operations website.

Develop S&L Sheets

- Develop S&L sheets.
- Coordinate with the Roadway Engineer and the Geotechnical Engineer.
- Obtain retaining wall alignment and elevation view from Roadway Engineer for sheet development.
- Consider the type of wall to be used, the treatment at the top of the wall required (e.g., moment slab, coping, or fence), and its proximity and interaction to adjacent structures and waterways.

Provide Constructability Review

- Verify that the structure can be reasonably constructed and determine a plausible phasing scheme.

Submit S&L Sheets to Railroad (If Applicable)

- Submit the draft Situation and Layout (S&L) showing all the required railroad information.
- Include the required Railroad Information Sheet in the submittal.
- Submit the Overhead Submittal Checklist to the Railroad.
- Submit the Overhead Grade Separation Data Sheet to the Railroad.
- Inform the railroad companies that they will have an opportunity for a final review of the S&L during final design. However, consensus must be reached on overall geometry at this time. It is important that the railroads are kept informed in the earlier stages to avoid impacts to the project schedule.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

3S5 Develop Situation and Layout (S&L) for Bridge

(back to table)

Overview

Develop the draft S&L sheets to ensure the compatibility between the structures and roadway design.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ AASHTO Guide Specifications for LRFD Seismic Bridge Design
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ S&L Sheets
- ☐ Initial Design Exception, Design Waiver or Deviation of UDOT Standards Form (If Applicable)
- ☐ QC Cover Sheets

Distribution

- ☐ Roadway Designer (3R1)
- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager (3S6)
- ☐ Project Geotechnical Engineer (3G1)
- ☐ Region Hydraulic Engineer (If Applicable)
- ☐ Railroad Companies / Chief Railroad Engineer (If Applicable)
- ☐ Region Utility and Railroad Coordinator (If Applicable)

Deliverable	Task	Responsible Party Activity Leader Bridge Design Engineer
S&L Sheets	▪ Obtain Draft Hydraulic/Scour Report (If Applicable)	X
	▪ Request Structure Number	X
	▪ Develop S&L Sheets	X
	▪ Provide Constructability Review	X
	▪ Submit S&L to Railroad (If Applicable)	X
Initial Design Exception, Design Waiver, or Deviation from UDOT Standards Form	▪ Prepare Initial Design Exception, Design Waiver or Deviation from UDOT Standards Form (If Applicable)	X
QC Cover Sheets	▪ Initiate QC Review	X

Obtain Draft Hydraulic/Scour Report (If Applicable)

Obtain draft hydraulic/scour report from the Hydraulics Engineer.

Request Structure Number

Submit a structure number request for a major structure through the UDOT Structures Design and Bridge Operations website.

Develop S&L Sheets

- Develop S&L sheets.
- Submit preliminary S&L sheets and preliminary structure foundation loads to the Geotechnical Engineer.
- Consider need for scour protection, rip rap, etc. (if applicable).

Provide Constructability Review

Verify that the structure can be reasonably constructed and determine a plausible phasing scheme.

Submit S&L Sheets to Railroad (If Applicable)

- Submit the draft Situation and Layout (S&L) showing all the required railroad information.
- Include the required Railroad Information Sheet in the submittal.
- Submit the Overhead Submittal Checklist to the Railroad.
- Submit the Overhead Grade Separation Data Sheet to the Railroad.
- Inform the railroad companies that they will have an opportunity for a final review of the S&L during final design. However, consensus must be reached on overall geometry at this time. It is

important that the railroads are kept informed in the earlier stages to avoid impacts to the project schedule.

Prepare Initial Design Exception, Design Waiver or Deviation from UDOT Standards Form (as applicable to Structures)

- Prepare initial design exception, design waiver or deviation from UDOT Standards form as it applies to structures.
- Submit for approval.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

3S6 Situation and Layout (S&L) Acceptance (Minor & Major)

(back to table)

Overview

Obtain acceptance from the Structures Division for S&L sheets and the Type Selection Report.

Deliverables

- ☐ Structural Documentation Package
- ☐ Acceptance of S&L – UDOT Structures Division Responsibility

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Project Manager
- ☐ UDOT Structures Construction Manager

Deliverable	Task	Responsible Party	
		Activity Leader	
		Structures Construction Manager	Structural Design Engineer
Structural Documentation Package	▪ Submit Structural Documentation Package		X
Acceptance of S&L	▪ Review Structural Documentation Package	X	
	▪ Accept S&L	X	

Submit Structural Documentation Package

Address all structures related review comments. See *UDOT QC/QA Procedures* for more information about completing the comment resolution form. Prepare a package for S&L Acceptance that would include the following:

- Structure Type Selection Report
  - Structure design criteria
  - Preliminary cost estimate
- Preliminary Seismic Strategy Report
- Situation & Layout plan sheet(s)
- Railroad company's review and acceptance (if applicable)
- Initial Design Exception, Design Waiver, or Deviation from UDOT Standards Form (if applicable)
- Responses to Review Comments
- QC/QA Documentation

Review Structural Documentation Package – UDOT Structures Division Responsibility

Verify all documentation is complete.

Accept S&L – UDOT Structures Division Responsibility

Complete Structures Acceptance form for S&L acceptance.

4SA Design and Detail Bridge

(back to table)

Overview

Based on the approved S&Ls and the structural design criteria, design, detail, and check the bridge. Incorporate design requirements and the preliminary information from the draft geotechnical report and/or the hydraulic report.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ AASHTO Manual for Condition Evaluation and Load and Resistance Factor
- ☐ AASHTO Guide Specifications for LRFD Seismic Bridge Design
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Superstructure Design Calculations
- ☐ Superstructure Plans
- ☐ Substructure Design Calculations
- ☐ Substructure Plans
- ☐ Final Seismic Strategy Report
- ☐ Load Rating VIRTIS Model
- ☐ Railroad Package (if applicable)
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager (4S4)
- ☐ Railroad Company/Chief Railroad Engineer (if applicable)
- ☐ Region Utility and Railroad Coordinator (if applicable)

Deliverable	Task	Responsible Party Activity Leader Bridge Design Engineer
Superstructure Design Calculations	▪ Provide Deck, Overhang, Approach slabs, and Parapet Design	X
	▪ Design Beam(s)	X
	▪ Design Bearing Pad	X
	▪ Determine Screed Elevations	X
Superstructure Plans	▪ Develop Superstructure Details	X
Substructure Design Calculations	▪ Determine Bridge Seat Elevations	X
	▪ Design Abutment(s) and Wingwall(s)	X
	▪ Design Bent(s)	X
	▪ Design Foundation(s)	X
Substructure Plans	▪ Develop Substructure Details	X
Final Seismic Strategy Report	▪ Perform Seismic Analysis	X
	▪ Prepare Final Seismic Strategy Report	X
Load Rating VIRTIS Model	▪ Perform Load Ratings	X
Railroad Package	▪ Submit S&L to Railroad (If Applicable)	X
QC Cover Sheets	▪ Initiate QC Review	X

Provide Deck, Overhang, Approach Slabs, and Parapet Designs

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Design Beam(s)

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Design Bearing Pad

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Determine Screed Elevations

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Develop Superstructure Details

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Determine Bridge Seat Elevations

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Design Abutment(s) and Wingwall(s)

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Design Bent(s)

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Design Foundation(s)

- Obtain final geotechnical report from Geotechnical Engineer.
- Perform the foundation design based on static loading, the seismic analysis, and the geotechnical report.

Develop Substructure Details

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Perform Seismic Analysis

Perform the seismic analysis based on input from the geotechnical engineer, the project specific requirements, and the *UDOT Structures Design and Detailing Manual*.

Prepare Final Seismic Strategy Report

- Finalize the design strategy for resisting the design seismic event.
- Include descriptions of expected damage, locations of plastic hinging, the redistribution forces, the mobilization of backfills, and the functions of bearings, as appropriate.

Perform Load Ratings

- Provide design load ratings using methods described in the AASHTO Manual for Condition Evaluation and Load and Resistance Factor (LRFR) of Highway Bridges.
- Provide both inventory and operating ratings.
- Submit load rating calculations.
- Perform load rating analysis in VIRTIS software and submit model.

Submit to Railroad (If Applicable)

- Submit 60% calculations to Railroad for underpass structures. (if applicable)
- Submit 60% plans to Railroad for underpass structures. (if applicable)
- Submit final design calculations for underpass structure.
- Submit final design plans for underpass structure.
- Ensure geotechnical report is included in all submittals.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

4SM Design and Detail Minor Structure

(back to table)

Overview

Design, detail, and check of the minor structure.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ AASHTO Manual for Condition Evaluation and Load and Resistance Factor
- ☐ AASHTO Guide Specifications for LRFD Seismic Bridge Design
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Minor Structure Design Calculations
- ☐ Minor Structure Plans
- ☐ Load Rating VIRTIS Model
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager (4S4)
- ☐ Project Geotechnical Engineer (if applicable)
- ☐ Project Hydraulic Designer (if applicable)

Deliverable	Task	Responsible Party Activity Leader Structural Design Engineer
Minor Structure Design Calculations	▪ Coordinate Design with Hydraulics and Geotechnical Engineers	X
	▪ Design Box Culvert	X
	▪ Design Headwall	X
	▪ Design Wingwalls, Aprons, and Cutoff Walls	X
Minor Structure Plans	▪ Develop Minor Structure Plans	X
Load Rating VIRTIS Model	▪ Perform Load Ratings	X
QC Cover Sheets	▪ Initiate QC Review	X

Coordinate Design with Hydraulics and Geotechnical Engineers

If sufficient information is available at this stage, advance the drainage structures. Otherwise, wait until 4Q1 and/or 4G1 are further progressed.

- Coordinate the geometry and sizing of the box culverts, headwalls, and other drainage structures with hydraulic requirements.
- Coordinate with the roadway design engineers to size the headwalls and wingwalls to accommodate grading requirements.
- Develop design based on the geotechnical report.

Design Box Culvert

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Design Headwall

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Design Wingwalls, Aprons, and Cutoff Walls

See the *UDOT Structures Design and Detailing Manual* for design requirements.

Develop Minor Structure Plans

- Develop drainage structure plans, including the layout of the wingwalls, aprons, and cutoff walls.
- Develop miscellaneous structure plans (headwalls, drainage boxes, etc.).
- Conform to *UDOT Structures Design and Detailing Manual* for developing and completing structure plan sheets. Refer to *UDOT Plan Sheet Development Standards* for supplemental information about developing plan sheets.

Perform Load Ratings

- Provide design load ratings using methods described in the AASHTO Manual for Condition Evaluation and Load and Resistance Factor (LRFR) of Highway Bridges.
- Provide both inventory and operating ratings.
- Submit load rating calculations with design calculations.
- Perform load rating analysis in VIRTIS software and submit model.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

4S1 Design and Detail Rehabilitation

(back to table)

Overview

Develop the rehabilitation procedures and repairs. Develop and check plans for the repair based on the design.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ AASHTO Manual for Condition Evaluation and Load and Resistance Factor
- ☐ AASHTO Guide Specifications for LRFD Seismic Bridge Design
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Structure Rehabilitation Design Calculations
- ☐ Structure Rehabilitation Plans
- ☐ Load Rating VIRTIS Model
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager (4S4)

Deliverable	Task	Responsible Party Activity Leader Structural Design Engineer
Structure Rehabilitation Design Calculations	▪ Design Procedures and Repairs	X
Structure Rehabilitation Plans	▪ Develop Repair Plans	X
	▪ Submit S&L to Railroad (If Applicable)	X
Load Rating VIRTIS Model	▪ Perform Load Ratings	X
QC Cover Sheets	▪ Initiate QC Review	X

Design Procedures and Repairs

Where required, develop design calculations to support the repair details.

Develop Repair Plans

Conform to *UDOT Structures Design and Detailing Manual* for developing and completing structure plan sheets. Refer to *UDOT Plan Sheet Development Standards* for supplemental information about developing plan sheets.

Submit to Railroad (If Applicable)

- Submit 60% calculations to Railroad for underpass structures. (if applicable)
- Submit 60% plans to Railroad for underpass structures. (if applicable)
- Submit final design calculations for underpass structure.
- Submit final design plans for underpass structure.
- Ensure geotechnical report is included in all submittals.

Perform Load Ratings

- Provide design load ratings using methods described in the AASHTO Manual for Condition Evaluation and Load and Resistance Factor (LRFR) of Highway Bridges.
- Provide both inventory and operating ratings.
- Submit load rating calculations with design calculations.
- Perform load rating analysis in VIRTIS software and submit model.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

4S2 Design and Detail Overhead Sign/VMS Structure

(back to table)

Overview

Based on the approved sign panel size and layout, design, detail, and check the sign structure supports.

References

- ☐ AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signs
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Sign Structure Design Calculations
- ☐ Sign Structure Plans
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager (4S4)

Deliverable	Task	Responsible Party Activity Leader Structural Design Engineer
Sign Structure Design Calculations	▪ Request Structure Number	X
	▪ Review Sign Structure Layout	X
	▪ Design Sign Structure	X
Sign Structure Plans	▪ Develop Sign Structure Plans	X
QC Cover Sheets	▪ Initiate QC Review	X

Request Structure Number

Submit a structure number request for sign structures through the UDOT Structures Design and Bridge Operations website.

Review Sign Structure Layout

- Review the sign panel and sign structure layouts and verify that their placement allows for an efficient sign structure design.
- Coordinate with the ATMS and electrical layouts to determine where conduit will be required.

Design Sign Structure

Determine if the standard sign structure design detailed in the *UDOT Structures Design and Detailing Manual* will apply. If the standard design does apply, use the panel arrangements and structure support locations to determine the appropriate structural element sizing. If the standard design does not apply, use the requirements in the design manual as well as project requirements to determine the correct sizing for the following elements, amongst others:

- Mast, elbow, and post tube sizes and thicknesses
- Drilled shaft diameters and depths
- Field and base plate requirements
- Sign panel and variable message sign (VMS) support requirements
- Handhole and chase nipple locations

Develop Sign Structure Plans

Use the Structures Division's working standard drawings for sign structures (standard or non-standard) along with the design to develop sign structure plans. Conform to *UDOT Structures Design and Detailing Manual* for developing and completing structure plan sheets. Refer to *UDOT Plan Sheet Development Standards* for supplemental information about developing plan sheets.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

4S3 Design and Detail Retaining Wall

(back to table)

Overview

Based on the roadway requirements, design and detail the wall layout and plans.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ AASHTO Guide Specifications for LRFD Seismic Bridge Design
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Wall Design Calculations
- ☐ Wall Plans
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Project Manager (4S4)
- ☐ Project Geotechnical Engineer

Deliverable	Task	Responsible Party Activity Leader Wall Design Engineer
Wall Design Calculations	▪ Coordinate with Roadway and Geotechnical Engineers	X
	▪ Design Wall	X
Wall Plans	▪ Develop Wall Plans	X
QC Cover Sheets	▪ Initiate QC Review	X

Coordinate with Roadway and Geotechnical Engineers

Coordinate details with the roadway and geotechnical engineers.

Design Wall

- Based on approved S&L, roadway profiles, and the geotechnical report, progress development of the wall design.

- Consider the treatments required at the top of the wall, including moment slabs, fences, and coping as well as tying the wall into an adjacent structure.

Develop Wall Plans

- Based on approved S&L, roadway profiles, and the geotechnical report, progress development of the wall plans.
- Consider the treatments required at the top of the wall, including moment slabs, fences, and coping as well as tying the wall into an adjacent structure.
- Conform to *UDOT Structures Design and Detailing Manual* for developing and completing structure plan sheets. Refer to *UDOT Plan Sheet Development Standards* for supplemental information about developing plan sheets.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

4S4 Complete Structure Project Documents

(back to table)

Overview

Finalize the structure plans, calculations, special provisions, measure and payment, and estimate.

References

- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT CADD Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Standard and Supplemental Specifications
- ☐ Specification Writer's Guide
- ☐ Measurement and Payment Template
- ☐ Acceptance and Documentation Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Structure Project Documents
  - Plans
  - Calculations
  - Cost Estimate
  - Special Provisions
  - Measurement and Payment
  - Acceptance and Documentation
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader

Deliverable	Task	Responsible Party Activity Leader Structural Design Engineer
Structure Project Documents	▪ Finalize Structural Plans	X
	▪ Finalize Structural Calculations	X
	▪ Finalize Structures Engineer's Estimate	X
	▪ Enter Structures Estimate in PDBS	X
	▪ Develop Special Provisions	X
	▪ Develop M&P and A&D	X
QC Cover Sheets	▪ Initiate QC Review	X

Finalize Structural Plans

Incorporate comments made throughout the project and finalize the plan sheets.

Finalize Structural Calculations

Incorporate comments made throughout the project and finalize the calculations.

Finalize Structures Engineer's Estimate

Update bid items, quantities, and unit prices. (see 3S1)

Enter Structures Estimate in PDBS

Develop Special Provisions

Provide all special provisions required for project construction not covered in the standard specifications.

- General Special Provisions
- Project Specific Special Provisions
- Use *Specification Writer's Guide*

Develop Measurement and Payment & Acceptance and Documentation

- Use PDBS to generate M&P for all standard bid items.
  - Develop M&P for all non-standard bid items.
  - Use the current *Measurement and Payment Template (M&P)* Template.
  - Include accurate description for all effort and materials required for construction.
  - Match M&P pay items and plan sheet pay items exactly.
- Use PDBS to generate A&D for all standard pay items.
  - Coordinate with the Resident Engineer (RE) to develop A&D for non-standard items.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

5S1 Deliver Final Structure Acceptance

(back to table)

Overview

Obtain the final acceptance to release the structural plans and documentation for advertising.

Deliverables

- ☐ Structural Documentation Package
- ☐ Acceptance of Structure – UDOT Structures Division Responsibility

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ UDOT Structures Construction Manager

Deliverable	Task	Responsible Party	
		Activity Leader	
		Structures Construction Manager	Structural Design Engineer
Structural Documentation Package	▪ Submit Structural Documentation Package		X
	▪ Submit to Railroad (If Applicable)		X
Acceptance of Structure	▪ Review Structural Documentation Package	X	
	▪ Accept Structure	X	

Submit Structural Documentation

Address all structures related review comments. See *UDOT QC/QA Procedures* for more information about completing the comment resolution form. Prepare a package for final review that would include the following:

- Completed Structural Plans (signed and sealed)
- Completed Special Provisions
- Engineer's Estimate
- Design Calculations
- Load Rating Report
- Load Rating VIRTIS Model
- Final Seismic Strategy Report
- Railroad approval (if applicable)
- Final Design Exception, Design Waiver, or Deviation of UDOT Standards Form (if applicable)
- Responses to review comments
- QC/QA Documentation
- Independent Review (if applicable)

- Ensure geotechnical report is complete
- Ensure hydraulic report is complete

Submit to Railroad (If Applicable)

- Submit 100% calculations, plans, and specifications to the Railroad.
- Include final geotechnical report.

Review Structural Documentation – UDOT Structures Division Responsibility

Accept Structure – UDOT Structures Division Responsibility

- Complete Structures Acceptance form for acceptance.
- Sign plans.

6S1 Structure Construction Services

(back to table)

Overview

Perform construction services during construction. Prepare "blue sheets" based on structural design changes and plan revisions.

References

- ☐ AASHTO LRFD Bridge Design Specifications
- ☐ UDOT Structures Design and Detailing Manual
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT CADD Standards
- ☐ UDOT QC/QA Procedures

Deliverables

- ☐ Shop Drawing Reviews
- ☐ Construction responses and/or direction
- ☐ "Blue Sheets"
- ☐ Final Structure inspection
- ☐ As-built Plans
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Resident Engineer
- ☐ UDOT Structures Construction Manager

Deliverable	Task	Responsible Party	
		Activity Leader	
		Structural Design Engineer	Structures Construction Manager
Shop Drawing Reviews	▪ Review Shop Drawings	X	
Construction Responses and/or Direction	▪ Perform Construction Services	X	
Blue Sheets	▪ Revise Calculations and Plans	X	
	▪ Submit "Blue Sheets"	X	
Final Structure Inspection	▪ Participate in Final Structure Inspection		X
As-built Plans	▪ Create and Submit As-built Plans	X	
QC Cover Sheets	▪ Initiate QC Review	X	

Review Shop Drawings

- Review shop drawings (construction submittals) as required.
- Refer to the *UDOT Structures Design and Detailing Manual* for shop drawing/construction review procedures.

Perform Construction Services

Perform construction services during construction.

Revise Calculations and Plans

Revise design calculations and plans to address changes.

Submit "Blue Sheets"

- Prepare revised sheets with correct revision clouds and notes.
- Submit revised sheets on blue paper.

Participate in Final Structure Inspection

Coordinate with Bridge Inspectors and UDOT Structures Construction Manager for final bridge inspection and acceptance.

Create and Submit As-built Plans

- Create as-built plans based on construction.
- Submit as-built plans to the UDOT Structures Division prior to project close out.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in the *UDOT Structures Design and Detailing Manual* and *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Initiate QC review for each submittal.
- Provide the Checker with a check print and supporting documentation for each deliverable.
- Provide the Checker with applicable QC cover sheets.
- Complete revisions based on QC review comments.

This page intentionally left blank

1T1 Assess Capacity and Safety Needs

(back to table)

Overview

Determine the existing traffic volumes and forecast future volumes or, if available, review data from environmental documents or other studies. Develop or review alternatives to accommodate existing, incremental, and future traffic volumes. Obtain the current safety needs and develop a strategy to address the project area's safety issues.

References

- ☐ Traffic and Safety Division Website
- ☐ Project OSR
- ☐ Travel Demand Model
- ☐ Signal Warrant Study
- ☐ MPOs
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Updated OSR
- ☐ Preliminary Capacity Summary
- ☐ Prioritized List of Safety Improvements
- ☐ Initial Capacity and Safety Improvements Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Roadway Designer (1R1)
- ☐ Project Manager
- ☐ Region Traffic Engineer

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Traffic Engineer	Traffic Operations Engineer
Updated OSR	▪ Review/Update OSR	X	
Preliminary Capacity Summary	▪ Obtain Traffic Counts	X	
	▪ Request Pertinent Traffic Studies (As Necessary)	X	
	▪ Review Existing Travel Demand Model	X	
	▪ Make Preliminary Capacity Improvement Recommendations	X	
Prioritized List of Safety Improvements	▪ Review Crash Data		X
	▪ Coordination with Local Agencies and Identify Safety Concerns	X	
	▪ Identify Safety Concerns		X
	▪ Identify Safety Mitigation/Remedies		X
	▪ Develop Safety Strategy to Address Deficiencies	X	
Initial Capacity and Safety Improvements Cost Estimate	▪ Develop Initial Capacity and Safety Improvements Cost Estimate	X	
QC Cover Sheets	▪ Initiate QC Review	X	

Review/Update OSR

- Obtain the OSR from the Concept Report or request an updated OSR if needed
- Review recommendations

If the project is strictly a signal project, the warrant study and warrant field review will replace the need for an OSR.

Obtain Traffic Counts

- Review any existing data.
- Collect 24-hour counts; also, collect the appropriate traffic data and determine the peak hour.
- Collect peak-hour turn movement counts.
- Perform the appropriate origin/destination study if needed.

Request Pertinent Traffic Studies (As Necessary)

Request the signal warrant study through the Region Traffic Engineer.

Review Existing Travel Demand Model

- Review the existing travel demand model to determine the project scope.
  - Coordinate with the MPO, the Planning Manager for TDM, and the Traffic Operations Planner
- Determine the limitations for the TDM and how the TDM can be used for the project.
  - Coordinate with the MPO, the Planning Manager for TDM, and the Traffic Operations Planner

Make Preliminary Capacity Improvement Recommendations

Create a summary of capacity improvement recommendations to provide the Roadway Designer (1R1). Coordinate the incorporation of recommendations into the preliminary footprint design and preliminary roadway cost estimate.

Review Crash Data

- Obtain the current crash data
- Review the types of crashes
- Identify the hot spot locations

Coordinate with Local Agencies and Identify Safety Concerns

Obtain additional information regarding the safety issues in the project area

Identify Safety Concerns

- Identify other safety issues or deficiencies by doing the following:
  - Coordinate with area maintenance personnel
  - Conduct field reviews if necessary

Identify Safety Mitigation/Remedies

Based on the information obtained, recommend possible mitigation for the identified safety concerns.

Develop Strategy to Address Safety Deficiencies

Prioritize the identified improvements

Develop Preliminary Safety Improvements Cost Estimate

Based on the recommendations for safety improvements, develop a cost estimate.

- Compile initial capacity and safety bid items and quantities
  - Verify bid items match UDOT standard bid items
- Develop unit costs for each item
  - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.)
  - Document unit cost development, assumptions, etc.
  - Account for project specific factors (see below)
- Use lump sum pricing only when appropriate

- Consider contractor risk due to unknown quantity
- Consider difficulty in pricing per unit
- Consider all materials and labor involved

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Time of year	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Specialty equipment	Constructability

Document QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

2T1 Develop Initial Capacity Analysis

(back to table)

Overview

Provide the draft traffic analysis report outlining specific recommendations for improving existing capacity. Develop the travel demand model to forecast future volumes and develop alternatives to accommodate the existing, incremental, and future traffic volumes.

References

- ☐ Traffic and Safety Division Website
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Draft Traffic Analysis Report
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Roadway Designer (2R1)
- ☐ Region Traffic Engineer
- ☐ Planning Manger for Travel Demand Models
- ☐ Traffic Operations Planner

Deliverable	Task	Responsible Party	
		Activity Leader	
		Traffic Engineer	Region Traffic Engineer (Review)
Draft Traffic Analysis Report	▪ Develop Travel Demand Model	X	
	▪ Develop Micro-Simulation Model	X	
	▪ Develop Capacity Summary	X	
QC Cover Sheets	▪ Initiate QC Review	X	

Develop Travel Demand Model

- Forecast design-year traffic volumes
- Determine if traffic projections are reasonable
- Develop traffic growth curves to identify the interim volumes at key years
- Evaluate the conditions prior to the planned capacity projects assumed to exist in the design year
- Coordinate with the MPO, the Planning Manager for TDM, and the Traffic Operations Manager

Develop Micro-Simulation Model

- Balance traffic volumes to prepare for their input into the appropriate traffic capacity analysis software.
- Build an appropriate micro-simulation model that is calibrated/validated for existing conditions:
  - For stop-controlled improvements, use the *Highway Capacity Manual* or Traffix
  - For arterial-street improvements, use Synchro/SimTraffic
  - For freeway and/or arterial improvements, use VISSIM or CORSIM
- Develop a model for the appropriate design year by building on the existing conditions analysis
- Determine if the traffic projections are reasonable
- Develop alternatives to accommodate the future traffic volumes
- Determine the numbers of lanes, including turn lanes
- Determine needed queue storage

Develop Capacity Summary

Prepare a draft of the capacity summary based on the template. Include all information necessary to determine and justify the improvement recommendations.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

3T1 Finalize Capacity Analysis

(back to table)

Overview

Provide the final traffic analysis report and outline specific recommendations for improving existing capacity.

References

- ☐ Traffic and Safety Division Website
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Access Justification Report (If Applicable)
- ☐ Interchange Justification Report (If Applicable)
- ☐ Final Traffic Analysis Report
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Roadway Designer (3R1)
- ☐ Region Traffic Engineer
- ☐ Traffic Operations Planner

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Traffic Engineer	FHWA (Review)
Access Justification Report Interchange Justification Report	▪ Prepare/Review Access Justification Report (AJR) and Obtain Approval from FHWA	X	
Final Traffic Analysis Report	▪ Adjust Model as Needed	X	
	▪ Finalize Traffic Analysis Report	X	
QC Cover Sheets	▪ Initiate QC Review	X	

Prepare/Review Access Justification Report (AJR) and Obtain Approval from FHWA

If an interchange access is modified, provide an AJR and submit to FHWA for approval.

Adjust Model as Needed

Based on information from 2T1 as well as comments from the Region Traffic Engineer, the MPO and Traffic Operations Planner should provide modifications to the traffic model.

Finalize Traffic Analysis Report

- Update the report based on the modifications to the model.
- If intersections meet a signal warrant or left-turn warrant, make recommendations in the report and request approval from the Central Traffic and Safety Department. Notify Central Traffic and Safety regarding any changes to posted speed limits.
- Submit the final traffic analysis report to the Region Traffic Engineer.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

2U1 Utility & Railroad Identification

(back to table)

Overview

Begin this activity as soon as possible. Early utility and railroad identification and coordination are critical to the success of the project. Identify all utility and railroad companies and complete an accurate depiction of existing utility facilities within the project limits.

References

- ☐ Roadway Design Manual of Instruction
- ☐ Manual for the Accommodation of Utilities and the Control and Protection of State Highway Rights of Way
- ☐ UDOT CADD Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Utility and Railroad Companies Contact List
- ☐ Subsurface Utility Engineering (SUE) Level B, C, and D
- ☐ Authorization for Design Expenditures
- ☐ Documentation of Railroad Surveillance Review (as necessary)
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Utility Companies
- ☐ Chief Railroad Engineer (cc: of railroad notification letters)
- ☐ Railroad Company (as necessary)

Project Delivery Network

Deliverable	Task	Responsible Party	
		Activity Leader: Region Utility and Railroad Coordinator	Utility Designer
Utility and Railroad Companies Contact List	▪ Identify Utility and Railroad Companies within Project Limits		X
Subsurface Utility Engineering (SUE) Level B, C, and D	▪ Notify Utility Companies of Project and Request Utility Records/Plans	X	
	▪ Hold Scoping Meeting with Utility Companies (as needed)	X	
	▪ Coordinate with Survey Team		X
	▪ Develop Subsurface Utility Engineering (SUE) Level B, C, and D		X
	▪ Review Horizontal Locations with Utility Owner	X	
Authorization for Design Expenditures	▪ Issue Authorization for Design Expenditures	X	
Documentation of Railroad Surveillance Review	▪ Obtain Surveillance Review (For At-Grade Railroad Crossings Only)	X	
QC Cover Sheets	▪ Initiate QC Review	X	X

Identify Utility and Railroad Companies within Project Limits

- Identify all utility and railroad companies within the project limits.
- Identify point of contact for each company for project design coordination.
- Develop a Utility and Railroad Companies Contacts List, which includes each contact's name, phone number, address, and email.

Notify Utility Companies of Project and Request Utility Records/Plans

Contact each utility and railroad company within the project limits. Provide each company with the following:

- Project area and description.
- Request the records and plans of their facilities within the project limits.
- Invitation to scoping meeting at least 30 day prior to the meeting.

Hold Utility Scoping Meeting (as needed)

If appropriate for the project, set up a utility scoping meeting to discuss the project. This meeting is meant to include all potentially affected utility companies in one meeting. Provide an agenda before the meeting. Finalize the meeting by providing meeting notes of all decisions and important discussions.

- Discuss project scope and schedule.
- Discuss coordination/communication plan.

- Discuss design alternatives that may avoid conflicts.
- Discuss utility relocation partnering between utilities. (i.e. potential of sharing trenches)
- Discuss future improvement plans and schedules. Determine if anything needs to happen prior to the current project.
- Discuss utility relocation review and relocation schedules

Coordinate with Survey Team

Coordinate with the Survey Team to gather all overhead, surface, and underground utility facilities within the project limits. Good communication with the Survey Team is extremely important to ensure repeat visits are not required. Clearly identify all utility facilities that are needed, including the underground facilities that will need to be dipped. Provide plans and records to the Survey Team as appropriate to assist their efforts in locating facilities and understanding what is required.

Develop Subsurface Utility Engineering (SUE) Level B, C, and D

Use utility company records, field observations, and collected survey information to develop Subsurface Utility Engineering (SUE) Level B, C, and D. Provide a complete depiction of the utility facilities within the project limits. Follow UDOT CADD standards and provide the information in the appropriate project CADD file format.

Review Horizontal Location with Utility Owner

- Provide maps showing the horizontal utility location for all utility owners to review.
- Address utility owners' review comments and resolve issues with the horizontal locations.
- Provide updated maps based on comments.

Issue Authorization for Design Expenditures

Prepare and issue authorization letters. The Consultant may prepare the letters, but they must be signed and issued by the Region Utility and Railroad Coordinator. Include a Project Scoping Meeting invitation with each authorization letter.

Obtain Surveillance Review (For At-Grade Railroad Crossings Only)

The surveillance team decides and formalizes track configuration commitments for grade separation structures.

- Region Utility and Railroad Coordinator contacts Chief Railroad Engineer to initiate surveillance review.
- Chief Railroad Engineer provides surveillance review. Refer to rule R930-5: Establishment and Regulation of At-Grade Railroad Crossings.
    - Provide the railroad company 30 days notice prior to surveillance review.
        - Notify the railroad company of the impending construction and request their updated facility plans. Provide a project area map and description. Develop a railroad reviews plan.
- The Chief Railroad Engineer uses Form R-709 to request Railroad Crossing Safety Funds for eligible at-grade crossings.

- The Chief Railroad Engineer provides the funding estimate to the Region Utility and Railroad Coordinator.
- The surveillance review provides at-grade crossing design preparation recommendations.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

3U1 Identify Potential Utility Conflicts

(back to table)

Overview

Identify potential utility conflicts through coordination with utility owners and designers. Obtain preliminary relocation costs from utility owners.

References

- ☐ Roadway Design Manual of Instruction
- ☐ Manual for the Accommodation of Utilities and the Control and Protection of State Highway Rights of Way
- ☐ UDOT CADD Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary Utility Conflict Matrix/Summary
- ☐ Initial Utility Company Cost Estimates
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Utility Companies

Deliverable	Task	Responsible Party	
		Activity Leader: Region Utility and Railroad Coordinator	Utility Designer
Preliminary Utility Conflict Matrix/Summary	▪ Evaluate Potential Utility Conflicts		X
	▪ Coordinate Utility Information Meeting	X	
	▪ Hold Utility Information Meeting	X	
Initial Utility Company Cost Estimate	▪ Compile Initial Utility Company Cost Estimates		X
QC Cover Sheets	▪ Initiate QC Review	X	X

Evaluate Potential Utility Conflicts

Using the current design files, determine all potential utility conflicts and organize in a matrix/summary.

- Meet with project team designers to discuss potential conflict locations and determine reasonable design modifications to avoid or minimize utility impacts.
- Develop a preliminary utility conflict/matrix summary based on design modifications.

Coordinate Utility Information Meeting

- Submit the preliminary utility conflict matrix/summary to affected utility companies.
- Submit appropriate design files to affected utility companies for review.
- Schedule a utility owner meeting. Meet on site to discuss potential conflicts and relocations.

Hold Utility Information Meeting

This meeting is to discuss each utility conflict and determine the resolution for each. Prior to the meeting, send the following to each utility owner:

- Utility Design Meeting notification letter
- Utility conflict matrix
- Applicable project design files
- Meeting Agenda (use the following discussion topics as needed)
    - Review the project scope and schedule.
    - Discuss all potential conflicts.
    - Discuss relocation efforts and schedules.
    - Discuss partnering opportunities.
    - Discuss alternative designs to avoid or limit relocations.
    - Discuss locations needing vertical identification.

Develop meeting notes and include all decisions, important discussions, action items, and schedule. Circulate the meeting notes to all attendees to assure all decisions and discussions were recorded correctly.

Compile Initial Utility Company Cost Estimate

Obtain initial utility relocation cost estimates from each impacted utility. Provide cost estimates to the Design Leader for inclusion in the total project cost estimate.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

3U2 Initial Design Utility Coordination

(back to table)

Overview

Conduct a utility design meeting to facilitate relocation solutions. Facilitate the development of utility owner relocation plans.

References

- ☐ Roadway Design Manual of Instruction
- ☐ Manual for the Accommodation of Utilities and the Control and Protection of State Highway Rights of Way
- ☐ UDOT CADD Standards
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Revised Utility Conflict Summary/Matrix
- ☐ Utility Company Plans, Schedules, and Cost Estimate Request
- ☐ Utility Agreements

Distribution

- ☐ ProjectWise
- ☐ Roadway Designer
- ☐ Roadway Hydraulics Designer
- ☐ Design Leader
- ☐ Utility Companies

Deliverable	Task	Responsible Party	
		Activity Leader	
		Region Utility and Railroad Coordinator	Utility Designer
Revised Utility Conflict Matrix/Summary	▪ Reevaluate Utility Conflicts		X
Utility Plans, Schedules, and Cost Estimates Request	▪ Utility Design Meeting	X	
	▪ Request Utility Owner Plans, Schedules, and Cost Estimates	X	
Utility Agreements	▪ Transmit Utility Agreements to Utility Owners	X	

Reevaluate Utility Conflicts

Using the current design files, reevaluate utility conflicts and revise the utility conflict matrix/summary.

- Meet with project team designers to discuss design modifications to avoid or minimize utility impacts.
- Revise the utility conflict/matrix summary based on design modifications.
- Identify conflict locations that need vertical (SUE level A) verification.
- Develop a cost estimate for the SUE level A verification efforts.

Hold Utility Design Meeting

This meeting is to discuss each utility conflict and determine the resolution for each. Prior to the meeting, send the following to each utility owner:

- Utility Design Meeting notification letter
- Utility conflict matrix
- Applicable project design files
- Meeting Agenda (use the following discussion topics as needed)
    - Project scope and schedule
    - Constructability issues
    - Each utility conflict
    - Utility work included in UDOT's plans
    - Specifications to be included
    - Utility partnering
    - Use of UDOT's contractor

Complete and distribute meeting notes documenting all decisions, important discussions, action items, and schedule.

Request Utility Plans, Schedules, and Cost Estimates

Send requests in a timely manner to allow for all utility relocation permits and agreements to be completed prior to the letting of the project contract and to allow for relocations to occur in advance of construction, where possible.

- Send each utility owner a set of preliminary project plans and a relocation plan request letter.
    - The request letter should request the following:
        - Request relocation plan utilizing the project plan sheets
        - Request a detailed schedule
        - Request an itemized cost estimate for utility relocations
        - Request contact information for the utility representative who will manage the relocation
        - Request information to be incorporated into the UDOT contract documents
    - The plans should be complete and include the following:
        - Location, type, size, material, and class of all existing facilities
        - Relevant information such as voltage, operating pressure, etc.
        - Temporary relocations/adjustments to facilities
        - Permanent relocations/adjustments to facilities (horizontal and vertical)
        - Facilities that will be left in place or removed and not replaced
        - Construction stages for relocations

    - Dimensions from critical project features such as right-of-way, highway centerline, ramps, bridges, etc.
- Set a deadline for utility owners to submit requested information.
    - Include time for issuing permits and agreements

Transmit Utility Agreements to Utility Owners

Write utility agreements (master and/or individual) at this time in such a way that project specific details that are not known at this time can be included later at the appropriate time without affecting the execution timeline of the agreement.

- Reference the Master Agreement with the Utility Information Meeting package already in existence.
- Provide an Individual Utility Agreement with the Utility Information Meeting package if the utility owner has not executed a Master Agreement with UDOT.
- Provide other agreements as necessary (i.e. UDOT contractor to perform work).
- Transmit agreements to utility owners to obtain signatures.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

3U3 Identify Utility Depth (SUE Level A)

(back to table)

Overview

Use the Utility Conflict Matrix/Summary to determine specific locations where vertical information could be used to avoid existing utility facility conflicts or assist utility companies design relocation plans.

References

- ☐ Utility Conflict Matrix/Summary (3U2)

Deliverables

- ☐ SUE Level A File
- ☐ SUE Mapping File Certification

Distribution

- ☐ ProjectWise
- ☐ Roadway Design Engineer
- ☐ Region Utility and Railroad Coordinator
- ☐ Hydraulics Design Engineer
- ☐ Structures Design Engineer

Deliverable	Task	Responsible Party	
		Activity Leader	
		Region Utility and Railroad Coordinator	Utility Designer
SUE Level A File	▪ Coordinate with SUE Consultant for SUE Level A Exploration of Existing Utilities		X
	▪ Review SUE Level A Microstation File		X

Coordinate with SUE Consultant for SUE Level A Exploration of Existing Utilities

Provide SUE Consultant with locations identified in 3U1 (Utility Conflict Matrix/Summary) to conduct SUE Level A Exploration.

Review SUE Level A Microstation File

- Verify SUE Level A MicroStation file (provided by SUE Consultant) is in the project coordinate system with all requested pothole locations displayed and identified completely.
- Verify SUE Consultant's SUE Mapping File Certification was uploaded onto ProjectWise.

3U4 Complete Utility and Railroad Designs

(back to table)

Overview

Complete utility relocation designs for all utility relocations for which UDOT is responsible. Develop preliminary utility relocation plan sheets and cost estimate. Develop at grade railroad crossing plans and verify surveillance report and railroad company guidelines compliance. (For grade separation crossings, see Structures activities)

References

- ☐ Roadway Design Manual of Instruction
- ☐ Manual for the Accommodation of Utilities and the Control and Protection of State Highway Rights of Way
- ☐ Utility Owner Standard and Specifications
- ☐ Railroad Company Standards and Specifications
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Preliminary Utility Relocation Plan Sheets
- ☐ At-Grade Railroad Crossing Surface and Warning Device Plans
- ☐ Utility Relocation/At Grade Crossing Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Design Leader
- ☐ Roadway Designer
- ☐ Hydraulic Design Engineer
- ☐ Region Utility and Railroad Coordinator
- ☐ Chief Railroad Engineer
- ☐ Railroad Companies

Deliverable	Task	Responsible Party		
		Activity Leader: Region Utility and Railroad Coordinator	Utility Designer	Railroad Crossing Designer
Preliminary Utility Plan Sheets	▪ Coordinate with Project Team Members		X	
	▪ Complete Utility Relocation Design		X	
	▪ Develop Preliminary Utility Plan Sheets		X	
	▪ Coordinate with Utility Owner	X		
Railroad At-Grade Crossing Surface and Warning Device Plans	▪ Develop At-Grade Railroad Crossing Design			X
	▪ Prepare Preliminary At-Grade Railroad Crossing Sheets			X
	▪ Submit At-Grade Railroad Crossing Sheets and forms for Railroad Company Review	X		
Utility Relocation/At-Grade Crossing Cost Estimate	▪ Develop Utility Relocation/At-Grade Crossing Cost Estimate		X	X
QC Cover Sheets	▪ Initiate QC Review			X

Coordinate with Project Team Members

Continually coordinate with project team members. Discuss aspects of the model and design with appropriate disciplines to ensure compliance with standards, with other designs, and address fatal flaws. Coordinate and mitigate project design conflicts, impacts, and deficiencies.

Complete Utility Relocation Design

Refer to the utility owner's standards and specifications to complete the utility relocation design.

- Assist other disciplines evaluate possible design modifications to avoid and/or minimize utility impacts.
- Conform to all applicable depth of bury, utility separation, clear zone, and ROW accommodation requirements.
- Conform to UDOT Standard and Supplemental Drawings.
- Design horizontal and vertical ties.
- Include utility betterment designs when applicable.
- Coordinate relocation designs with other disciplines.
- Conform to UDOT CADD Standards.

Develop Preliminary Utility Plan Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to develop preliminary utility relocation plan sheets for review. These sheets are to provide a review of the utility

relocation design. It is recommend that only the information required for final utility design review be placed on the sheets at this time. Verify with the project manager the expected level of effort for the review submittal. QC review is required before distribution for all labels, callouts, notes, and information found on the plan sheets.

- For all utility relocation sheets, do the following:
  - Combine with other sheets whenever possible.
  - Follow the UDOT Plan Sheet Development Standards General Plan Sheet Requirements when generating plan sheets, drafting, referencing, and callouts.
  - Follow the UDOT Plan Sheet Development Standards Utility and Utility Relocation Sheet Requirements.
    - Provide all information needed for review (i.e. size, type, material, etc.).
    - Label all streets and important existing features.
    - Ensure all existing features are displayed in proper grayscale.
- If more detailed utility relocation sheets are required:
  - Use applicable requirements from UDOT Plan Sheet Development Standards Roadway Plan & Profile Sheet Requirements.
  - Provide all callouts and labels necessary to review the relocation design.

Coordinate with Utility Owner

Coordinate a review of the utility relocation design with the utility owner. Address all review comments and make necessary revisions.

Develop At-Grade Railroad Crossing Design

- Develop the proposed at grade crossing including, but not limited to, the following:
  - Warning Device design
  - Grading
  - Pavement section
  - Lane transitions
  - Cut/fill lines
    - Identify additional ROW impacts
    - Identify additional utility impacts
  - Maintenance Access
  - Fences
  - Pedestrian Access
  - Raised Islands
  - Removals
  - Trails
  - Preliminary Signing
- Evaluate clear zone hazards and appropriate protection devices.
- Conform to Railroad Company standards.
- Conform to UDOT standards.
  - Roadway Manual of Instruction
  - UDOT Standard and Supplemental Drawings

- Calculate quantities

Prepare At-Grade Railroad Crossing Plan Sheets

Follow current Railroad Company requirements and standards and *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to create railroad crossing plan sheets.

- Create all necessary sheets for a railroad crossing review.
- Label all important design features.
- Include utility, ROW, and drainage information.
- Include all Railroad Company required information.

Develop Utility Relocation/At-Grade Railroad Crossing Cost Estimate

- Compile railroad crossing bid items and quantities.
  - Use UDOT standard bid items.
- Develop unit costs for each item.
  - Use appropriate resources for developing unit costs (PDBS, local contractors, etc.).
  - Document unit cost development, assumptions, etc.
  - Account for project specific factors (see below).
- Use lump sum pricing only when appropriate.
  - Consider contractor risk due to unknown quantity.
  - Consider difficulty in pricing per unit.
  - Consider all materials and labor involved.

Project Specific Unit Price Factors		
Location	Current bidding environment	Risk to contractor
Time of year	Availability of materials	Inflation
Limitations of operation	Familiarity of process	Construction Schedule
Quantity of item	Specialty equipment	Constructability

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

Submit Railroad Crossing Sheets and Forms for Railroad Company Review

Follow the current Railroad Company requirements to complete and submit all required forms.

- Prepare all forms and documents the Railroad Company requires for review.
- Submit review plans and forms to the Chief Railroad Engineer.
- Submit plans and forms to the railroad company for review and comments.
  - Request the preliminary surface and signal cost estimate from Union Pacific Railroad for their facility modifications.
  - Incorporate facility modification requests from UTA or other private owners into the schedule and cost estimate.

4U1 Prepare and Obtain Utility and Railroad Agreements and Permits (back to table)

Overview

Finalize Individual Utility Agreements, Cooperative Agreements, Construction and Maintenance Agreement, and Permits required for project advertisement and construction.

References

- ☐ Roadway Design Manual of Instruction
- ☐ UDOT Betterment Agreement Website
- ☐ Manual for the Accommodation of Utilities and the Control and Protection of State Highway Rights of Way
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ Executed Individual Utility Agreements
- ☐ Executed Cooperative Agreements with Municipalities and Service Districts
- ☐ Executed Construction and Maintenance Agreement
- ☐ Wireline, Pipeline, and Encroachment Permits
- ☐ QC Cover Sheets

Distribution

- ☐ Project File
- ☐ Contracts, Estimates and Agreements Supervisor, Construction Division
- ☐ Internal Audit
- ☐ Comptroller's Office
- ☐ Project Manager
- ☐ Utility Companies, Municipalities, Service Districts
- ☐ Chief Railroad Engineer
- ☐ Railroad Companies

Deliverable	Task	Responsible Party Activity Leader Region Utility and Railroad Coordinator
Executed Individual Utility Agreements	▪ Complete Utility Agreements	X
Executed Cooperative Agreements	▪ Complete Cooperative Agreements	
Executed Construction and Maintenance Agreement	▪ Complete Railroad Construction and Maintenance Agreement	X
Wireline, Pipeline, and Encroachment Permits	▪ Prepare Wireline, Pipeline, and Encroachment Permits for UDOT Utilities in Railroad ROW	X
Authorization to Proceed with Work	▪ Provide Authorization to Proceed with Work for Utility Companies	X
QC Cover Sheets	▪ Initiate QC Review	X

Complete Utility Agreements

The Consultant Utility Coordinators may prepare Reimbursement, Betterment, and Cooperative Agreements for submittal and review by the UDOT Project Manager and Region Utility and Railroad Coordinator. The Region Utility and Railroad Coordinator prepares the R-709. The Agreements are signed by the Utility Company and on behalf of UDOT. The Comptroller's office executes the signed Agreements. Distribute the executed copies.

Complete Cooperative Agreements

Coordinate with the local municipalities to develop cooperative agreements as needed.

Complete Railroad Construction and Maintenance Agreement

Upon receipt of a Cost Estimate or instruction from other railroad owners, the Project Railroad Coordinator incorporates the correct information and language into the Construction and Maintenance Agreement.

The Utility Engineer provides the Project Utility and Railroad Coordinator with an estimated railroad flagging duration to complete required at-grade crossing modifications. This duration is included in the Construction and Maintenance Agreement.

The Project Utility and Railroad Coordinator compiles Construction and Maintenance Agreement information.

The Consultant Railroad Coordinators may prepare the Railroad Agreement for submittal and review by the UDOT Project Manager and the Region Utility and Railroad Coordinator. The Region Utility and

Railroad Coordinator prepares the R-709. The Agreement signed on UDOT's behalf and executed by the Comptroller's office. Authorize the Railroad Companies to proceed with work. Distribute executed copies.

Prepare Wireline, Pipeline, and Encroachment Permits for Utilities in Railroad ROW

Provide Authorization to Proceed with Work for Utility Companies

Sign and distribute document authorizing Utility Companies to proceed with work.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** submitting for signatures and distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation.
- Provide the Checker with applicable cover sheets.
- Complete revisions based on QC review comments.

4U2 Final Design Utility Coordination

(back to table)

Overview

Final coordination with utility owners and provide guidance and information to complete utility relocation plans. Hold a meeting to resolve any remaining conflicts and prepare for the construction stage.

References

- ☐ Manual for the Accommodation of Utilities and the Control and Protection of State Highway Rights of Way
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Utility Company Plans, Schedules, and Cost Estimates

Distribution

- ☐ ProjectWise
- ☐ Roadway Designer
- ☐ Roadway Hydraulics Designer
- ☐ Design Leader

Deliverable	Task	Responsible Party	
		Activity Leader: Region Utility and Railroad Coordinator	Utility Designer
Utility Plans, Schedules, and Cost Estimates	▪ Hold Final Utility Design Meeting	X	
	▪ Review Utility Owner Plans, Schedules, and Cost Estimates	X	

Hold Final Utility Design Meeting

This meeting is to discuss and resolve remaining conflicts or issues. Prior to the meeting, send a meeting agenda to all attendees. (Use the following discussion topics as needed)

- Project scope and schedule
- Constructability issues
- Remaining conflicts
- Specifications to be included
- Utility partnering
- Construction schedules

- Use of UDOT's contractor

Complete and distribute meeting notes documenting all decisions, important discussions, action items, and schedule.

Review Utility Owner Plans, Schedules, and Cost Estimates

Review the final utility plans, schedules, and cost estimates for compliance with project design and goals. Coordinate and resolve any deficiencies with the utility owner.

4U3 Complete Utility and Railroad Plans and Documents

(back to table)

Overview

Complete utility plans and documents. Obtain the UDOT Chief Railroad Engineer's and Railroad Company(s)' approval for the crossing modification or construction plans. Finalize railroad crossing plan sheets and develop all railroad project documents, including Railroad Company required special provisions. Obtain executed construction and maintenance agreements from the Railroad Company(s).

References

- ☐ Roadway Design Manual of Instruction
- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ UDOT Standard and Supplemental Drawings
- ☐ UDOT Standard and Supplemental Specifications
- ☐ Specification Writer's Guide
- ☐ Measurement and Payment Template
- ☐ Acceptance and Documentation Guide
- ☐ Project Development Business System
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Utility Relocation/At-Grade Crossing Comment Resolutions
- ☐ Utility Relocation Plan Sheets
- ☐ At-Grade Railroad Crossing Plan Sheets
- ☐ Utility Relocation/ At-Grade Crossing Project Documents
- ☐ Utility Relocation/At-Grade Crossing Cost Estimate
- ☐ QC Cover Sheets

Distribution

- ☐ Design Leader
- ☐ ProjectWise
- ☐ Utility Owner

Deliverable	Task	Responsible Party Activity Leader Utility Designer
Utility Relocation/At-Grade Crossing Comment Resolutions	▪ Address Utility Relocation/At-Grade Crossing Review Comments	X
Utility Relocation Plan Sheets	▪ Finalize Utility Relocation Design	X
	▪ Complete Utility Relocation Plan and Profile Sheets	X
	▪ Complete Utility Relocation Summary Sheets	X
At-Grade Railroad Crossing Plan Sheets	▪ Finalize At-Grade Railroad Crossing Design	X
	▪ Complete At-Grade Railroad Crossing Improvements Plan Sheets	X
Utility Relocation/At-Grade Crossing Cost Estimate	▪ Finalize Utility Relocation/At-Grade Crossing Cost Estimate	X
	▪ Enter Utility Relocation/At-Grade Crossing Cost Estimate into PDBS	X
Utility Relocation/At-Grade Crossing Project Documents	▪ Develop Utility Relocation/At-Grade Crossing Project Documents	X
QC Cover Sheets	▪ Perform QC Review	X

Address Utility Relocation/Railroad Review Comments

Address all utility/railroad related review comments. See *UDOT QC/QA Procedures* for more information about completing comment resolutions. Revise the design based on comment resolutions.

Finalize Utility Relocation Design

Finalize the utility relocation design based on review comments and coordination with team members. Refer to 3U4 as needed.

Complete Utility Relocation Plan and Profile Sheets

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to finalize the utility relocation plan sheets.

- Follow the UDOT Plan Sheet Development Standards Topo & Utility Sheet Requirements
- Follow the UDOT Plan Sheet Development Standards Utility Relocation Sheet Requirements
- Follow addition applicable PSDS requirements for more extensive designs and details
  - UDOT Plan Sheet Development Standards Roadway Plan and Profile Requirements
  - UDOT Plan Sheet Development Standards Detail Sheet Requirements
- Revise/update information labeled in previous review submittals as necessary
- Include all quantities and start/end stations

- Verify that the callouts are correctly placed and labeled

Finalize At-Grade Railroad Crossing Improvements Design

Finalize the railroad crossing design based on review comments and coordination with team members. Refer to 3U4 as needed.

Complete At-Grade Railroad Crossing Improvements Plan Sheets

Follow current *UDOT CADD Standards*, *UDOT Plan Sheet Development Standards*, and Railroad Company standards to finalize the utility relocation plan sheets.

- Update/include all necessary information (callouts, notes, etc.)
- Include all necessary details
  - Follow UDOT Plan Sheet Development Standards Detail Sheet Requirements

Complete Utility Relocation Summary Sheets

- Prepare summary sheets in accordance with *UDOT Plan Sheet Development Standards* and *Summary Sheet CADD Standards*
  - General Plan Sheet Requirements (Department or Region)
  - Summary Sheet Requirements
- Use UDOT Excel spreadsheets and customize for the project
  - Include all utility relocation related pay items and necessary non-pay items
  - Include names, alignment designations, stations, offsets, units, and quantities
  - Show enough detail to support calculations
- Use UDOT standard summary plan sheets
  - Export all summaries from Excel to Microstation

Finalize Utility Relocation/At-Grade Crossing Cost Estimate

- Update bid items and quantities
- Update unit costs (see 3U4)

Enter Utility Relocation/At-Grade Crossing Estimate into PDBS

Develop Utility Relocation/At-Grade Crossing Project Documents

- Incorporate utility information into utility special provisions and limitations of operations.
  - Provide all special provisions required for project construction.
    - General Special Provisions
    - Project Specific Special Provisions
  - Use *Specification Writer's Guide*
- Generate M&P for all bid items
  - Develop M&P for all non-standard bid items
  - Use the current *Measurement and Payment Template*
  - Include accurate description for all effort and materials required for construction.
  - M&P pay items must match plan sheet pay items exactly

- Generate A&D for all standard pay items
  - Use the Acceptance and Documentation Guide
  - Coordinate with the RE to develop A&D for non-standard items

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

5U1 Deliver Utility Certification

(back to table)

Overview

Complete and issue the Utility Certification for advertisement.

Resources

- ☐ UDOT Advertising Checklist Instructions

Deliverables

- ☐ Utility Certification

Distribution

- ☐ ProjectWise
- ☐ Contracts, Estimates and Agreements Supervisor, Construction Division
- ☐ Internal Audit
- ☐ Comptroller's Office
- ☐ Project Manager

Deliverable	Task	Responsible Party Activity Leader Region Utility and Railroad Coordinator
Utility Certification	▪ Issue Utility Certification	X

Issue Utility Certification

UDOT must enter into a formal agreement with all Utility and Railroad companies whose facilities are impacted by the project. A Utility Certification is needed to verify all agreements are signed and in place for affected utilities. The Region Utility and Railroad Coordinator creates, signs, and issues the utility certification

1V1 Kickoff Meeting

(back to table)

Overview

Prepare for and hold the initial project team meeting. The purpose of the meeting is to introduce team members, to familiarize the team with the project, to review the proposed project scope, proposed schedule and proposed budget, and to commit to the project's success.

References

- ☐ UDOT Practical Design Guide

Deliverables

- ☐ Meeting Agenda
- ☐ Meeting Notes
- ☐ Project Communications Plan
- ☐ Project Objective Statement

Distribution

- ☐ ProjectWise
- ☐ Project Team

Deliverable	Task	Responsible Party Activity Leader Project Manager
Meeting Agenda	▪ Develop Meeting Agenda	X
	▪ Invite Meeting Attendees	X
	▪ Hold Meeting	X
Meeting Notes	▪ Compile Meeting Notes	X
Project Communications Plan	▪ Develop/Revise Project Communications Plan	X
Project Objective Statement	▪ Develop/Revise Project Objective Statement	X

Develop Meeting Agenda

Plan the time and location. Identify and schedule resources (vehicles, drivers, etc.). Prepare and distribute the agenda for review before the meeting. The following are potential agenda items and materials:

- **Field Visit**
- Team Member Introductions Including Role on the Project
- Review Project Location
- Review Concept Report
- Review Project Objective Statement

- Discuss Scope, Schedule, and Budget
- Review/Approve Project Communication Plan
- Review *UDOT QC/QA Procedures*
- Discuss Lessons Learned from Previous Projects

Invite Meeting Attendees

Invite all potential project team members. Include the following with the invitation:

- Summary of the scope
- Meeting Agenda
- Draft Scope, Schedule, and Budget
- Draft Project Charter and Communication Plan

The following must be invited to the Kickoff Meeting

Region		
▪ **Maintenance Area Supervisor** ▪ Region Materials Engineer ▪ Region Pavement Management Manager ▪ Region Environmental Engineer	▪ Region Utility and Railroad Coordinator ▪ Region ROW Engineer ▪ Region Traffic Engineer ▪ Region PIM	▪ Project Design Engineer ▪ Design Engineer ▪ Surveyor ▪ Region Landscape Architect ▪ Region Hydraulics Engineer
Central Support Personnel		
▪ Geotechnical Engineer ▪ Structural Engineer	▪ Environmental Engineer ▪ Hydraulic Engineer	▪ Lead Project ROW Agent ▪ TOC
Consultant Team If Applicable		

In addition to all team members, consider inviting the following:

Outside Agencies		
▪ FHWA	▪ Local Municipality Representative	▪ Irrigation Company Representative
Region		
▪ Region Director ▪ Region Preconstruction Engineer	▪ Region District Engineer ▪ Region Archaeologist	▪ Resident Engineer ▪ Shed Foreman
Central Support Personnel		
▪ Value Engineer Manager ▪ ROW Deputy Director	▪ Traffic Operations ▪ Traffic Signal and Lighting Program Manager/Engineer	▪ Traffic and Safety ▪ Pedestrian and Bicycle Planner

Hold Meeting

Conduct the meeting according to the agenda.

- Provide the following at the meeting:
  - Concept Report
  - Project Location Mapping (e.g., USGS Quads, GoogleEarth, and As-Builts)
  - Proposed Scope, Schedule, and Budget

    - Project Charter
- Each member signs the Project Charter

Meeting Notes

Develop meeting notes and distribute them to all invitees. Include the following:

- Decisions
- Action Items
- Revisions to Draft Scope, Budget, and Schedule
- Revisions to Draft Project Charter and Communications Plan (if necessary)

Finalize Project Objective Statement

Based on discussions at the Kickoff Meeting, finalize the project objective statement. (See

Finalize Communications Plan

Based on discussions at the Kickoff Meeting, finalize the draft communications plan.

1V2 Scoping Meeting

(back to table)

Overview

This meeting is to develop a clear project scope, schedule, and budget to which all team members agree. Renew commitments so they all concur with the new scope, schedule, and budget. Identify any changes to the initial first cut geometry and all ensuing alterations to other disciplines based on those modifications. Review, negotiate, and set ePM durations.

Deliverables

- ☐ Meeting Agenda
- ☐ Distributed Review Material
- ☐ Meeting Notes
- ☐ Review Meeting Comments
- ☐ Revised Project Scope/Schedule/Budget
- ☐ Internal Preconstruction Engineering (PE) Budget

Distribution

- ☐ ProjectWise
- ☐ Project Team

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Manager	Discipline Leads
Meeting Agenda	▪ Prepare Meeting Agenda	X	
Distributed Review Material	▪ Distribute Review Material	X	
Meeting Notes	▪ Hold Meeting	X	
	▪ Prepare Meeting Notes	X	
Review Meeting Comments	▪ Compile Review Meeting Comments		X
Revised Project Scope/Schedule/Budget	▪ Revise Project Scope/Schedule/Budget	X	
Internal PE Budget	▪ Review ePM	X	
	▪ Set Internal PE Budget	X	

Prepare Meeting Agenda

Arrange the location and time of the meeting. Prepare the meeting agenda. Below are suggested agenda items:

- Review project definition document.

- Review summaries from the various disciplines to identify variance between the original assumed project scope and the identified project needs from the summary reports.
- Review preliminary durations and hours set in ePM for each activity.
- Identify constructability issues that may impact project costs, project schedule, and construction phasing.
- Review the Preliminary Cost Estimate and identify any variance with the current funding. Agree on units of measure for pay items. Review assumed unit costs.
- Review the Draft Transportation Management Plan (TMP) and identify conflicts.
- Identify project scope modifications that will be incorporated into the project and document why any suggested scope modifications will not be included.
- Review PDC
- Review multi-modal needs
- Identify any additional design exceptions that will be required.
- Identify innovative contracting opportunities (e.g., lane rental, P+T, and incentive/disincentive).
- Agree upon the project's committed advertising date.
- Identify schedule impacts due to the scope modifications.
- Determine any budget changes needed due to scope modifications.
- Identify the additional design effort needed due to scope modifications.
- Identify contract modifications required.
- Develop a schedule for team meetings.
- Review QA Audit Form to ensure the QC/QA Procedure is being followed.

Distribute Review Material

Invite all project team members and others as needed. Distribute all review materials and meeting agenda.

The following must receive a copy of the review material:

▪ Project Manager	▪ Region Landscape Architect	▪ Region ROW Engineer
▪ Design Leader	▪ Region Utilities Coordinator	▪ Region Archaeologist
▪ Region Preconstruction Engineer	▪ Region Pavement Engineer	▪ Region Traffic Engineer
▪ Resident Engineer (2 copies)	▪ Region Materials Engineer	▪ Region Land Surveyor
▪ Maintenance Shed Foreman	▪ Maintenance Area Supervisor	▪ District Engineer
▪ Region Environmental Engineer	▪ Local Municipality Representative	▪ Region PIM

Distribute review materials to the following if the project includes applicable items:

▪ Central Traffic & Safety	▪ Central Geotechnical	▪ Central Hydraulics
▪ Structures	▪ Central ROW Representative	▪ Consultant Design Team
	▪ FHWA Representative	

Hold Meeting

Hold meeting according to the Agenda.

Prepare Meeting Notes

Assign a team member to compile the meeting notes. Send the meeting notes to all team members and meeting attendees for approval.

Compile Review Meeting Comments

Each discipline lead is responsible to gather review meeting comments that relate to their discipline. Add the review meeting comments to the discipline comment resolution form.

Revise Project Scope, Schedule, and Budget (as necessary)

Revise project scope, schedule, and budget based on discussions at the Scoping Meeting.

Review ePM

Confirm that all disciplines have updated ePM according to discussions at the Scoping Meeting. Evaluate project completion and milestone meeting dates. Evaluate resource allocation.

Set Internal PE Budget

Review scope, ePM durations, and individual discipline projected hours to set the PE budget for the project.

2V1 Geometry Review Meeting

(back to table)

Overview

This meeting is to review the recommended roadway alignments consistency, accuracy, and constructability within the project scope and discuss available funding. Prior to the meeting, determine the format of the design review.

Deliverables

- ☐ Meeting Agenda
- ☐ Distributed Review Package
- ☐ Meeting Notes
- ☐ Initial Disposition Review Comment Resolution Form

Distribution

- ☐ ProjectWise
- ☐ Project Team
- ☐ Reviewers
- ☐ Optional Meeting Attendees

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Manager	Discipline Leads
Meeting Agenda	▪ Prepare Meeting Agenda	X	
Distributed Review Package	▪ Distribute Review Package	X	
Meeting Notes	▪ Hold Meeting	X	
	▪ Prepare Meeting Notes	X	
	▪ Update the Project Goals	X	
Initial Disposition Review Comment Resolution Form	▪ Compile Review Meeting Comments		X

Prepare Meeting Agenda

Arrange the location and time of the meeting. Prepare the meeting agenda. Below are suggested agenda items:

- Review project definition document
- Review action items from previous milestone review meetings
- Review PDC
- Identify any additional design exceptions, design waivers, or deviations from standards
- Identify any design conflicts between disciplines.
- Resolve any design conflicts between disciplines.

- Review the design for constructability issues.
- Review the project phasing and maintenance-of-traffic.
- Review the current Total Project Cost Estimate and identify any variance with the current funding. Agree on units of measure for additional pay items. Review assumed unit costs.
- Review the current status of the design exceptions.
- Review innovative contracting opportunities (e.g., lane rental, P+T, and incentive/disincentive).
- Review project milestones, including committed advertising date.
- Review ROW strategy.
- Review QC/QA documentation and ensure the QC procedure is being followed.
- Review project commitments.
- Review QA Audit Form to ensure the QC/QA Procedure is being followed

Distribute Review Material

Invite all project team members and others as needed. Distribute all review materials and meeting agenda.

The following must receive a copy of the review material:

▪ Project Manager	▪ Region Landscape Architect	▪ Region ROW Engineer
▪ Design Leader	▪ Region Utilities Coordinator	▪ Region Archaeologist
▪ Region Preconstruction Engineer	▪ Region Pavement Engineer	▪ Region Traffic Engineer
▪ Resident Engineer (2 copies)	▪ Region Materials Engineer	▪ Region Land Surveyor
▪ Maintenance Shed Foreman	▪ Maintenance Area Supervisor	▪ District Engineer
▪ Region Environmental Engineer	▪ Local Municipality Representative	▪ Region PIM

Distribute review materials to the following if the project includes applicable items:

▪ Irrigation Company Representative	▪ Central Geotechnical	▪ Central Hydraulics
▪ Central Traffic & Safety	▪ Central ROW Representative	▪ Consultant Design Team
▪ Structures	▪ FHWA Representative	

Hold Meeting

Hold meeting according to the agenda.

Prepare Meeting Notes

Capture all decisions made and create an action item list. Distribute the meeting notes to all meeting invitees.

Update the Project Goals

The Project Manager should revise the project goals based on the changes identified during the meeting.

Compile Review Meeting Comments

Each discipline lead is responsible to gather discipline related review comments and provide initial dispositions. See *UDOT QC/QA Procedures* for more information about completing the initial disposition review comment resolution form.

3V1 Plan-in-Hand Review Meeting

(back to table)

Overview

The plan-in-hand review is for the final review of all major roadway, hydraulic, drainage, ITS, utility, geotechnical and ROW designs, which should be complete. The meeting should include reviews to determine available funding and consistency, accuracy, and constructability within the project scope.

Deliverables

- ☐ Meeting Agenda
- ☐ Distributed Review Material
- ☐ Meeting Notes
- ☐ Initial Disposition Review Comment Resolution Form

Distribution

- ☐ ProjectWise
- ☐ Project Team
- ☐ Reviewers
- ☐ Optional Meeting Attendees

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Manager	Discipline Leads
Meeting Agenda	▪ Prepare Meeting Agenda	X	
Distributed Review Material	▪ Distribute Review Material	X	
Meeting Notes	▪ Hold Meeting	X	
	▪ Prepare Meeting Notes	X	
Initial Disposition Review Comment Resolution Form	▪ Compile Review Meeting Comments		X

Prepare Meeting Agenda

Arrange the location and time of the meeting. Prepare the meeting agenda. Below are suggested agenda items:

- Field visit
- Review project definition document
- Review action items from previous milestone review meetings
- Review comment resolution form
- Review PDC
- Review design exceptions, design waivers, and deviations from standards
- Review the list of plan sheet responsibilities and revise as necessary for upcoming activities.

- Resolve any remaining design conflicts between disciplines.
- Review the design for constructability issues.
- Review the project phasing and maintenance-of-traffic.
- Identify any limitations of operations.
- Identify any maintenance problem areas.
- Verify that all commitments have been incorporated, including those regarding environmental, ROW, and PI.
- Review the current Engineer's Estimate and identify any variance with the current funding. Agree on units of measure for additional pay items. Review assumed unit costs.
- Review innovative contracting opportunities (e.g., lane rental, P+T, and incentive/disincentive).
- Review project milestones, including committed advertising date.
- Review ROW strategy.
- Review QA Audit Form to ensure the QC/QA Procedure is being followed.
- Review project commitments.

Distribute Review Material

Invite all project team members and others as needed. Distribute all review materials and meeting agenda.

The following must receive a copy of the review material:

- Project Manager
- Design Leader
- Region Preconstruction Engineer
- Resident Engineer (2 copies)
- Maintenance Shed Foreman
- Region Environmental Engineer
- Region Landscape Architect
- Region Utilities Coordinator
- Region Pavement Engineer
- Region Materials Engineer
- Maintenance Area Supervisor
- Local Municipality Representative
- Region ROW Engineer
- Region Archaeologist
- Region Traffic Engineer
- District Engineer
- Region PIM

Distribute review materials to the following if the project includes applicable items:

- Irrigation Company Representative
- Central Traffic & Safety
- Structures
- Central Geotechnical
- Central ROW Representative
- FHWA Representative
- Central Hydraulics
- Consultant Design Team
- Region Land Surveyor

Hold Meeting

Hold meeting in accordance with the meeting agenda.

Prepare Meeting Notes

Capture all decisions made and create an action item list. Distribute the meeting notes to all meeting invitees

Compile Review Meeting Comments

Each discipline lead is responsible to gather discipline related review comments and provide initial dispositions. See *UDOT QC/QA Procedures* for more information about completing the initial disposition review comment resolution form.

4V1 PS&E Review Meeting

(back to table)

Overview

The purpose of this activity is to ensure that the elements provided in the plan sheets and advertising documents are consistent with the project scope and available funding requirements. The meeting should include reviews to determine consistency, accuracy, and constructability.

Deliverables

- ☐ Meeting Agenda
- ☐ Distributed Review Material
- ☐ Meeting Notes
- ☐ Initial Disposition Review Comment Resolution Form

Distribution

- ☐ ProjectWise
- ☐ Project Team
- ☐ Reviewers
- ☐ Optional Meeting Attendees

Deliverable	Task	Responsible Party	
		Activity Leader: Project Manager	Discipline Leads
Meeting Agenda	▪ Prepare Meeting Agenda	X	
Distributed Review Material	▪ Distribute Review Material	X	
Meeting Notes	▪ Hold Meting	X	
	▪ Prepare Meeting Notes	X	
Initial Disposition Review Comment Resolution Form	▪ Compile Review Meeting Comments		X

Prepare Meeting Agenda

Arrange the location and time of the meeting. Prepare the meeting agenda. Below are suggested agenda items:

- Review project definition document
- Review meeting minutes and action items from previous milestone review meetings.
- Review PDC
- Review design exceptions, design waivers, and deviations from standards
- Review plan set for any outstanding issues.
- Review project documents for any outstanding issues

- Review Engineer's Estimate and identify any variance with the current funding. Agree on units of measure for additional pay items. Review assumed unit costs.
- Review innovative contracting opportunities (e.g., lane rental, P+T, and incentive/disincentive).
- Review ROW progress.
- Review QA Audit Form to ensure the QC/QA Procedure is being followed.
- Review project commitments.
- Review the current engineer's estimate and identify any variance with the current funding. Review assumed unit costs.
- Review committed advertising date.

Distribute Review Material

Invite all project team members and others as needed. Distribute all review materials and meeting agenda.

The following must receive a copy of the review material:

▪ Project Manager ▪ Design Leader ▪ Region Preconstruction Engineer ▪ Resident Engineer (2 copies) ▪ Maintenance Shed Foreman ▪ Region Environmental Engineer	▪ Region Landscape Architect ▪ Region Utilities Coordinator ▪ Region Pavement Engineer ▪ Region Materials Engineer ▪ Maintenance Area Supervisor ▪ Local Municipality Representative	▪ Region ROW Engineer ▪ Region Archaeologist ▪ Region Traffic Engineer ▪ District Engineer ▪ Region PIM

Distribute review materials to the following if the project includes applicable items:

▪ Irrigation Company Representative ▪ Central Traffic & Safety ▪ Structures	▪ Central Geotechnical ▪ Central ROW Representative	▪ Central Hydraulics ▪ Consultant Design Team ▪ Region Land Surveyor

Invite Meeting Attendees

Invite all team members, reviewers, and additional attendees. Verify all attendees received copies of review materials. Include the agenda with the invitation.

Prepare Meeting Notes

Capture all decisions made and create an action item list. Distribute the meeting notes to all meeting invitees.

Compile Review Meeting Comments

Each discipline lead is responsible to gather discipline related review comments and provide initial dispositions. See *UDOT QC/QA Procedures* for more information about completing the initial disposition review comment resolution form.

5V1 Comment Resolution Review Meeting

(back to table)

Overview

This meeting is to review the final comment resolution form. At the completion of this activity, all comment resolutions are to be accepted by the respective reviewer. There is to be no review of the plans other than spot checks of proper comment incorporation.

Deliverables

- ☐ Revised Comment Resolution Form (if needed)
- ☐ Revised Plan Sheets and Documents (as needed)
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Project Team
- ☐ Reviewers

Deliverable	Task	Responsible Party		
		Activity Leader		
		Project Manager	Design Leader	Discipline Leads
Revised Comment Resolution Form	▪ Invite Meeting Attendees	X		
	▪ Hold Meting	X		
	▪ Revise Comment Resolution Form (if needed)		X	
Revised Plan Sheets and Documents	▪ Revise Plan Sheets and Documents (as needed)		X	
QC Cover Sheets	▪ Initiate QC Review			X

Invite Meeting Attendees

Determine time and location of the meeting and invite all team members and reviewers. Distribute the comment resolution form before the meeting. Distribution of plans and documents is by request only.

Hold Meeting

Revise Comment Resolution Form (if needed)

Revise the comment resolution form based on the discussions with the reviewers. An agreement must be reach for all comments. For all unresolved comments between designer and reviewer, the project manager will have the final decision.

Revise Plan Sheets and Documents (if needed)

As needed, revise the plan sheets and documents based on the final comment resolution form.

Perform QC Review (if needed)

For each revised deliverable, initiate the QC Review following the Design Network QC/QA Procedures before final distribution.

- Create a check print for each deliverable and provide to the Checker
- Provide the Checker with appropriate cover sheets
- Complete revisions based on comments by Checker and Back Checker

1Y1 Prepare/Compile Scoping Review Package

(back to table)

Overview

Prepare and compile all discipline review materials to produce the Scoping Review Package.

Deliverables

- ☐ Scoping Review Package

Distribution

- ☐ ProjectWise
- ☐ Project Manager
- ☐ Project Team Members
- ☐ Reviewers
- ☐ Scoping Meeting (1V2)

Deliverable	Task	Responsible Party	
		Activity Leader: Design Leader	Project Manager
Scoping Review Package	▪ Compile Initial Project Cost Estimate	X	
	▪ Prepare Scoping Review Package	X	

Compile Initial Total Project Cost Estimate

Obtain the each discipline's cost estimate and compile them into one document.

Prepare Scoping Review Package

- Compile all review materials from each discipline
- Prepare a review package including the following:
  - Discipline summary reports
  - Initial Project Cost Estimate
  - Project estimate ePM Screen 505
  - Initial Preliminary Typical Section
  - Design Review Drawing

Distribute the package to all meeting attendees and reviewers a minimum of one week prior to the Scoping Meeting (1V2).

1Y2 Develop Project Design Criteria (PDC)

(back to table)

Overview

Develop the PDC.

References

- ☐ AASHTO, A Policy on Geometric Design of Highways and Streets
- ☐ UDOT Roadway Design Manual of Instruction
- ☐ UDOT Project Design Criteria Website
- ☐ Critical Elements
- ☐ Additional Design Criteria
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists
- ☐ UDOT Practical Design Guide

Deliverables

- ☐ PDC Form
- ☐ Project Document Cover Sheet

Distribution

- ☐ ProjectWise
- ☐ Roadway Design Engineer
- ☐ Project Manager
- ☐ Region Preconstruction Engineer

Deliverable	Task	Responsible Party Activity Leader Design Leader
PDC Form	▪ Develop PDC	X
Project Document Cover Sheet	▪ Initiate QC Review	X
PDC Form	▪ Coordinate with Region Preconstruction Engineer for PDC Approval	X

Develop PDC

Following guidelines in the *UDOT Roadway Design Manual of Instruction*, develop the PDC. Obtain (or review from the Concept Report) information including design speed, design vehicle, design year, terrain, and Project Traffic Report. Use this data to complete the PDC for the project. Using the form, develop criteria for critical elements and design waivers.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide the Checker with a check print of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

Coordinate with Region Preconstruction Engineer for PDC Approval

Work with the Preconstruction Engineer to ensure the PDC meets the proper standards and requirements and submits the form to the Region Preconstruction Engineer for approval.

2Y1 Prepare/Compile Geometry Review Package

(back to table)

Overview

Compile comment resolutions, project cost estimate, and all discipline review materials to produce the Geometry Review Package.

Deliverables

- ☐ Final Disposition Review Comment Resolution Form
- ☐ Geometry Review Package

Distribution

- ☐ ProjectWise
- ☐ Project Manager
- ☐ Project Team Members
- ☐ Reviewers
- ☐ Geometry Review Meeting (2V1)

Deliverable	Task	Responsible Party	
		Activity Leader: Design Leader	Project Manager
Final Disposition Review Comment Resolution Form	▪ Final Disposition Review Comment Resolution Form	X	
Geometry Review Package	▪ Review PDC	X	
	▪ Compile Project Cost Estimate	X	
	▪ Prepare Geometry Review Package	X	

Prepare Final Disposition Review Comment Resolution Form

See *UDOT QC/QA Procedures* for more information about completing the final disposition review comment resolution form.

Review PDC

Review the PDC based on comments from the scoping review.

Compile Project Cost Estimate

Obtain the each discipline's cost estimate and compile them into one document.

Prepare Geometry Review Package

Compile all review materials from each discipline into one review package.

- Scoping Review Comment Resolution Form

- Project Cost Estimate
- Review Drawings (in approved formats)
- Other discipline review materials

Distribute the review package to all meeting attendees and reviewers a minimum of one week prior to the Geometry Review Meeting (2V1).

3Y1 Prepare/Compile Plan-in-Hand Review Package

(back to table)

Overview

Compile comment resolutions, project cost estimate, and all discipline review materials to produce the Plan-in-Hand Review Package.

Deliverables

- ☐ Final Disposition Review Comment Resolution Form
- ☐ User Costs (for Price + Time Bidding)
- ☐ Plan-in-Hand Review Package

Distribution

- ☐ ProjectWise
- ☐ Project Manager
- ☐ Project Team Members
- ☐ Reviewers
- ☐ Plan-in-Hand Review Meeting (3V1)

Deliverable	Task	Responsible Party	
		Activity Leader: Design Leader	Project Manager
Final Disposition Review Comment Resolution Form	▪ Prepare Final Disposition Review Comment Resolution Form	X	
User Costs (for Price +Time Bidding)	▪ Determine Traffic Control Restrictions	X	
	▪ Coordinate with the TMD	X	
	▪ Finalize User Costs	X	
Plan-in-Hand Review Package	▪ Review PDC	X	
	▪ Compile Project Cost Estimate	X	
	▪ Prepare Plan-in-Hand Review Package	X	

Prepare Final Disposition Review Comment Resolution Form

See *UDOT QC/QA Procedures* for more information about completing the final disposition review comment resolution form.

Determine Traffic Control Restrictions

Coordinate with the project team to determine the following:

- Construction phasing
  - Schedule
  - Phasing limits

- Unique traffic control or maintenance of traffic issues
- Preliminary MOT design
- Construction limitations

Coordinate User Cost Analysis with the TMD

Coordinate with the Traffic Management Division (TMD) to determine the user costs.

Finalize User Costs

Coordinate, as necessary, with the project team to adjust traffic control, maintenance of traffic, and construction restrictions and methods to reduce user costs and construction related delays. Determine the final estimated user costs.

Review PDC

Review and update the PDC based on comments from the geometry review.

Update Project Cost Estimate

Obtain the each discipline's cost estimate and compile them into one document.

Prepare Plan-in-Hand Review Package

Prepare Plan-in-Hand Review Package:

- Geometry Review Comment Resolution Form
- All Preliminary Plan Sheets
- Typical Sections
- Project Cost Estimate
- Project estimate ePM Screen 505

Distribute the package to all meeting attendees and reviewers a minimum of two weeks prior to the Plan-in-Hand Meeting (3V1)

4Y1 Prepare/Compile PS&E Review Package

(back to table)

Overview

Compile comment resolutions, project cost estimate, and all discipline review materials to produce the PS&E Review Package.

References

- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ Specification Writer's Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ Final Disposition Review Comment Resolution Form
- ☐ Plan Set Sheets
- ☐ Project Cost Estimate
- ☐ Special Provisions
- ☐ PS&E Review Package
- ☐ QC Cover Sheets

Distribution

- ☐ ProjectWise
- ☐ Project Manager
- ☐ Project Team Members
- ☐ Reviewers
- ☐ PS&E Review Meeting (4V1)

Deliverable	Task	Responsible Party	
		Activity Leader: Design Leader	Project Manager
Final Disposition Review Comment Resolution Form	▪ Prepare Final Disposition Review Comment Resolution Form	X	
Plan Set Sheets	▪ Compile Plan Set Sheets	X	
Project Cost Estimate	▪ Update Project Cost Estimate	X	
	▪ Verify PDBS Estimate	X	
Special Provisions	▪ Prepare Non-Discipline Specific Special Provisions	X	
QC Cover Sheets	▪ Initiate QC Review	X	
PS&E Review Package	▪ Prepare PS&E Review Package	X	

Prepare Final Disposition Review Comment Resolution Form

See *UDOT QC/QA Procedures* for more information about completing the final disposition review comment resolution form.

Complete Plan Set Sheets

The Design Leader is responsible to complete the non-discipline plan sheets, including:

- Title Sheet
- Index Sheets
- Cross Reference Sheet
- Other sheets needed to complete the plan set

Follow the current *UDOT CADD Standards* and *UDOT Plan Sheet Development Standards* to complete the plan sheets.

- Follow the General Plan Sheet Requirements when generating plan sheets, drafting, and referencing
- Follow the Title Sheet & Sheet 1's requirements
  - Title Sheet
  - Index Sheets
  - Cross Reference Sheet/Sheet Location Map
- Abbreviations and Legend Sheet
- Complete each sheet and provide all necessary information

Update Project Cost Estimate

Obtain the each discipline's cost estimate and compile them into one document.

Verify PDBS Estimate

Verify all disciplines have entered their final estimates into PDBS correctly. Assist the discipline leads as needed.

Prepare Non-Discipline Specific Special Provisions

Provide all non-discipline specific special provisions required for project construction.

- General Special Provisions
- Project Specific Special Provisions
- Use *Specification Writer's Guide*

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution.

- Provide Checker with check prints of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

Prepare PS&E Review Package

- Compile all discipline documents for review (plan sheets, special provisions, M&P, etc.)
- Complete the non-discipline specific plan sheets, including title sheet, index sheet, cross reference sheet and others needed to complete the plan set.
- Prepare the PS&E review package, include
  - Complete plan set
  - All special provisions, specifications, supplemental specifications
  - Project Cost Estimate
  - M&P, A&D, and other project documents
  - Project estimate ePM Screen 505

Distribute the package to all meeting attendees and reviewers a minimum of two weeks prior to the PS&E Review Meeting (4V1).

5Y1 Incorporate PS&E Review Comments

(back to table)

Overview

Make revisions based on comments made during PS&E Review (4V1).

References

- ☐ UDOT CADD Standards
- ☐ UDOT Plan Sheet Development Standards
- ☐ Specification Writer's Guide
- ☐ UDOT QC/QA Procedures
- ☐ UDOT Project Delivery Network QC/QA Checklists

Deliverables

- ☐ Final Disposition Review Comment Resolution Form
- ☐ QC Cover Sheets
- ☐ Final Plan Set & Project Documents Package

Distribution

- ☐ ProjectWise
- ☐ Project Manager
- ☐ Project Team Members
- ☐ Reviewers
- ☐ Comment Resolution Meeting (5V1)

Deliverable	Task	Responsible Party	
		Activity Leader	
		Design Leader	Discipline Leads
Final Disposition Review Comment Resolution Form	▪ Prepare Final Disposition Review Comment Resolution Form	X	
Final Plan Set & Project Documents Package	▪ Address and Incorporate PS&E Review Comments		X
	▪ Revise Project Cost Estimate	X	
QC Cover Sheets	▪ Initiate QC Review	X	
Final Plan Set & Project Documents Package	▪ Compile Final Plan Set and Project Document Package	X	

Prepare Final Disposition Review Comment Resolution Form

See *UDOT QC/QA Procedures* for more information about completing the final disposition review comment resolution form.

Address and Incorporate PS&E Review Comments

Coordinate with each discipline to incorporate the PS&E review comments, as needed.

- Address all review comments
- Revise plans and project documents based on review comments

Revise Project Cost Estimate

Based on revisions made to the design, coordinate with each discipline to revise the project cost estimate.

Initiate QC Review

Initiate the QC Review in accordance with *UDOT QC/QA Procedures* and supplemental information in *UDOT Project Delivery Network QC/QA Checklists* **before** distribution. Use appropriate QC checklists as needed.

- Provide Checker with check prints of each deliverable and supporting documentation
- Provide the Checker with applicable cover sheets
- Complete revisions based on QC review comments

Compile Final Plan Set and Project Document Package

Coordinate with project team members to finalize the plan set and project documents for advertisement.

1Z1 Project Setup

(back to table)

Overview

The Project Manager sets up the project in ePM, verifies project funding, sets up the project file and determines the need for VE, CEVP, and type of project delivery. The Project Manager writes the project Definition Document and identifies the project resources based on information from the concept report and functional managers. This is a high level look at resources and staffing required to successfully deliver the project.

References

- ☐ Project Concept Report
- ☐ Environmental Document
- ☐ Project Delivery Handbook

Deliverables

- ☐ Project Definition Document
- ☐ Identification of Project Resources
- ☐ Project Set-Up

Distribution

- ☐ ProjectWise
- ☐ Programming
- ☐ Activity Leaders & Team Members
- ☐ Kickoff Meeting (0V1)

Deliverable	Task	Responsible Party: Activity Leader: Project Manager
Form R-709	▪ Ensure That Project Is in a Funded Year	X
	▪ Obligate Funds	X
Project Definition Document	▪ Obtain and Review Project File	X
	▪ Develop Project Definition Document	X
Identification of Project Resources	▪ Identify If VE Is Needed	X
	▪ Identify If CEVP Is Needed	X
	▪ Identify Appropriate Project Delivery Method	X
	▪ Identify Project Staffing Strategy	X
	▪ Identify Project Team	X
Project Set-Up	▪ Set Up Project in ePM	X
	▪ Verify Project File System	X

Ensure That Project Is in a Funded Year

The Project Manager checks ePM screen 710 and 505, PIN tab, to confirm that Program Development has established a project identification number (PIN) and that the project has PE funding in the current fiscal year. If not, e-mail the STIP Development Coordinator, and request appropriate revisions.

Obligate Funds

The Project Manager emails Program Finance requesting obligation of design funds.

Obtain and Review Project File

The Project Manager reviews all contents of the project file and becomes familiar with them. At a minimum, the file should contain the following:

- Planning/Corridor Studies
- Concept Report
- Alternative Delivery Methods (Design Bid Build or CMGC)
- Cost Estimate (Verify Funding Is Correct)
- Environmental Clearance
    - Confirm the project will require a categorical exclusion and at what level it will be
    - Coordinate with region environmental staff

Develop Project Definition Document

The Project Manager, in consultation with proposed core team members, develops the Project Definition Document. This Document is found on the UDOT Project Management Tools Website (insert link). This Document should be sent to the proposed project team prior to the Kickoff Meeting and used as a basis for the project scope if consultant(s) is used for project delivery.

Identify If VE Is Needed

Identify the cost for VE.

Identify If CEVP Is Needed

Identify the cost for CEVP.

Identify Appropriate Project Delivery Method

Evaluate whether alternate delivery methods are applicable (i.e. Design/Bid/Build, CMGC, Design-Build, etc.) If Design-Build is selected, then use the Design-Build Network found in the project delivery handbook.

Identify Project Staffing Strategy

The Project Manager, in consultation with functional manager(s), determines a project staffing strategy. The strategy should address if the work should be performed in-house, by a consultant, or by a combination of both.

- Determine project staffing needs based upon the type and characteristics of the project.
  - Determine technical needs of the project
  - Determine technical capabilities within the department
  - Determine the PI needs for the project
  - Determine availability of staffing resources
  - Determine if this project will be performed in-house, by a consultant, or a combination of both
  - Determine time limitations

Identify Project Team

If the strategy shows need for in-house staff, identify specific staff to include on the team. The Project Manager and Functional Manager(s) agree to team members and assign all key team members (i.e. Phase Leader, Resident Engineer, Environmental Lead, Hydraulics Engineer, Structures Project Manager, ROW Agent, design staff, etc.).

Set Up Project in ePM

At this time, the Project Manager should have enough information to set up the project in ePM Screen 450, "Network Selector/Activity Generator." The Project Manager may not have enough information to override any durations or hours, but s/he can choose the "Simple, Average, or Complex option."

- Choose network and choose activities
- Include setup of categorical exclusion form in ePM if necessary

Verify Project File System

1Z2 Obtain Design and Mapping Consultants

(back to table)

Overview

Obtain design and mapping consultants. The mapping consultant may be obtained separately from the design consultant. The mapping consultant should be obtained as quickly as possible. This activity may be used on in-house design projects as well as consultant design projects and may include hiring a consultant to complete the entire design or to complete specific portions of the project.

Resources

- ☐ Consultant Services Manual of Instruction
- ☐ Consultant Services Division Website

Deliverables

- ☐ Executed Mapping Contract
- ☐ Executed Design Contract

Distribution

- ☐ ProjectWise
- ☐ Program Manager
- ☐ Consultant Services Administrator

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Manager	Consultant Services Administrator
Executed Mapping Contract Executed Design Contract	▪ Determine Type of Consultant Selection	X	
	▪ Coordinate with Consultant Services	X	
	▪ Obtain Consultants		X

Determine Type of Consultant Selection

The Project Manager determines the type of consultant selection, e.g., pool, standard request for qualifications (RFQ), or streamlined standard request for qualifications (RFQ). The type of selection may be different for each consultant. The mapping consultant will generally be a pool contract that is independent from any design contracts. The Project Manager is responsible for initiating the request for qualifications.

Coordinate with Consultant Services

Based on the determination of type of consultant selection, review the current Consultant Services Manual of Instruction and identify the documents the Project Manager is responsible to submit. Coordinate with Consultant Services throughout the selection process.

Obtain Consultants

Select design and mapping consultants and execute the contracts following the process outlined in the *Consultant Services Manual of Instruction*. It is not necessary for the mapping consultant selection and contract execution to occur at the same time as the design consultant selection and contract execution.

5Z1 Project Management

(back to table)

Overview

This activity is for the Project Manager oversight of the project through the entire design phase.

Deliverables

- ☐ Team Meetings and Meeting Notes
- ☐ Updated ePM
- ☐ Project Responsibility Chart
- ☐ Processed Invoices
- ☐ Contract Modifications

Distribution

- ☐ ProjectWise
- ☐ Project Team (As Applicable)
- ☐ Program Manager (As Applicable)

Deliverable	Task	Responsible Party Activity Leader Project Manager
Team Meetings and Meeting Notes	▪ Facilitate Coordination Between Disciplines	X
	▪ Schedule and Attend Team Meetings and Facilitate Meeting Notes	X
Updated ePM	▪ Update/Review ePM	X
Project Responsibility Chart	▪ Maintain Project Responsibility Chart	X
Processed Invoices	▪ Review/Process Consultant Invoices	X
Contract Modifications	▪ Contract Modifications	X

Facilitate Coordination Between Disciplines

The success of any project relies upon the constant coordination between all team members. The Project Manager is responsible to facilitate and encourage constant coordination between disciplines. This includes regular design meetings, informal forms of coordination, and ensuring all disciplines have the latest updates and revisions.

Schedule and Attend Team Meetings and Facilitate Meeting Notes

This covers preparation and attendance of regular project team meetings for all team members (e.g., bi-weekly team meetings). This does not include the time to prepare and attend the milestone meetings or other meetings associated with a specific activity. For example, 1P1 Develop Initial PI Plan will likely involve a coordination meeting with several project team members. The time spent on this meeting should be charged to 1P1, not 5Z1.

The following tasks are the responsibility of the Project Manager, but should be appropriately delegated to project team members as needed.

- Schedule regular project team meetings
  - Revise the schedule as needed and inform all team members
- Coordinate the compilation of meeting notes
- Distribute meeting notes to all team members and meeting attendees

Update/Review ePM

Project Discipline Leads are responsible to update ePM for their activities. This task is to review updates and project status in ePM. The PM is responsible to make sure the project is on schedule, within allocated resources (budget, staff, etc.), and within scope. Coordinate with Discipline Leads to address projected needs that will exceed the schedule, resources, and scope.

Maintain Project Responsibility Chart

Complete the project responsibility chart with the names of the people responsible for each position. Revise the chart if there are position changes.

Review/Process Consultant Invoices

Contract Modifications

This covers all time spent identifying, developing, and negotiating contract modifications. See the *Consultant Services Manual of Instruction* for specific requirements.

1Z3 Develop Draft Design Transportation Management Plan (TMP)

(back to table)

Overview

Develop a draft Design Transportation Management Plan (TMP) to coordinate traffic control, PI, and maintenance of traffic with adjacent projects.

Deliverables

- ☐ TMP Summary Report
- ☐ Draft Design TMP

Distribution

- ☐ ProjectWise
- ☐ Scoping Meeting (1V2)

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Manager	Design Leader
Draft Design TMP	▪ Identify the Need for a Transportation Management Plan (TMP)	X	
	▪ Assemble Traffic Planning Team (TPT)	X	
	▪ Analyze Potential Project Impacts		X
	▪ Develop Draft Design TMP		X
TMP Summary Report	▪ Develop TMP Summary Report		X
Draft TMP	▪ Develop a Plan, Cost, and Schedule to Develop and Implement the TMP		X

Identify the Need for a Transportation Management Plan (TMP)

Refer to UDOT Policy 08-5 for guidelines regarding the need for a TMP.

If a TMP is needed, complete the following tasks:

Assemble Traffic Planning Team (TPT)

Analyze Potential Project Impacts

Develop Draft Design TMP

- Identify Limitations of Operations
- Identify Adjacent Projects
    - Identify Potential Conflicts

    - Recommend Schedule Changes if Necessary to Avoid Conflicts
- Identify PI Requirements
- Identify Alternate Routes

Develop TMP Summary Report

Include the following:

- TMP Summary
    - Provide TMP Summary to Region PIM
- Initial Cost Estimate
    - Construction Costs
    - Design Costs
- Recommended coordination with adjacent projects

Develop a Plan, Cost, and Schedule to Develop and Implement the TMP

1Z4 Hold Right-of-Way Strategy Meeting

(back to table)

Overview

The purpose of this meeting is to develop a strategy to optimize the ROW acquisition schedule and minimize project costs. Identify design changes that could minimize ROW impacts. Identify critical parcels that could affect the timely delivery of the project. Develop a strategy to mitigate the critical parcels and to acquire all ROW.

References

- ☐ Right of Way Division Website

Deliverables

- ☐ Meeting Set-up
- ☐ ROW Acquisition Strategy
- ☐ Initial ROW Cost Estimate

Distribution

- ☐ Design Leader
- ☐ Roadway Designer
- ☐ ROW Designer
- ☐ Lead ROW Agent
- ☐ Region ROW
- ☐ ProjectWise

Deliverable	Task	Responsible Party		
		Activity Leader: Project Manager	Central ROW	Region ROW
Meeting Set-up	▪ Set Up Meeting	X		
ROW Acquisition Strategy	▪ Conduct Field Review of the Project		X	
	▪ Identify Parcels to Avoid		X	
	▪ Develop Initial ROW Requirements			X
	▪ Develop Initial Acquisition Schedule		X	
Initial ROW Cost Estimate	▪ Develop Initial ROW Cost Estimate		X	

Set Up Meeting

- Prepare a time and location for the meeting
- Assign someone to take meeting notes.

Meeting Attendees could include, but are not limited, to the following:

Project Delivery Network

Meeting Attendees
Project Manager
Region ROW
Central ROW
Lead ROW Agent
Environmental Manager
Roadway Designer
Design Leader
Public Involvement
ROW Designer

Conduct Field Review of the Project

- The project team should conduct a physical or virtual drive-thru of the project
- Each ownership within the project limits should be photographed

Identify Parcels to Avoid

- Identify high price parcels or with a high potential to delay the project schedule.
- Brainstorm design alternatives that may avoid these parcels. Things to consider:
  - Can a straight ROW setback be used on this project?
  - Can the ROW be widened to one side or the other?

Develop Initial ROW Requirements

- Identify funding sources (federal versus state)
- Determine number of ownerships for various project alternatives
- Determine the total acquisitions versus partial acquisitions
  - Determine relocations required by type (business versus non-business)

Develop Initial ROW Cost Estimate

- Develop typical unit costs for the various parcel types
- Calculate the acquisition costs
- Calculate the total project ROW costs
- Provide the cost estimate to Design Leader

Develop Initial Acquisition Schedule

- Identify parcels eligible for pre-categorical exclusion acquisitions
- Prioritize the order of acquisition (which deals take longest)
- Coordinate the time frame with Phase Leader

1Z5 Set Preliminary Design Activity Hours and Durations

(back to table)

Overview

This activity is to be used by all disciplines to determine and set the hours and durations of each of their design activities. The project manager determines the duration of this activity as the time between the kickoff meeting and scoping meeting.

Deliverables

- ☐ Preliminary Activity Durations and Hours

Distribution

- ☐ Project Manager
- ☐ Design Leader

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Manager	Discipline Leads
Preliminary Activity Durations and Hours	▪ Set 1Z5 Duration	X	
	▪ Determine and Set Preliminary Activity Durations and Hours		X

Set 1Z5 Duration

The project manager is responsible for setting the duration of this activity.

- The duration of this activity will determine the time between the kickoff and scoping meetings.
- Analyze the size, objective, and budget of the project when determining how much time is needed for each discipline to complete the scoping stage.
- The project manager accepts the risk associated with the allotted time (i.e. shorter duration may lead to more unknowns).

Determine and Set Preliminary Activity Durations and Hours

Each discipline is to use this time **only** for determining the durations and hours of their activities. All other scoping activities are to be done with their discipline specific scoping activities.

- Coordinate with the project manager to determine the time needed for this activity
- For each activity required for the project, set preliminary durations and hours in ePM.
- Coordinate with other team members as needed.

3Z1 Obtain CMGC

(back to table)

Overview

Using the UDOT CMGC procurement process, develop the RFP for the selection of a CMGC contractor and select a CMGC contractor.

References

- ☐ UDOT CMGC Website
- ☐ Consultant Services Website

Deliverables

- ☐ CMGC RFP
- ☐ Executed CMGC Contract
- ☐ Executed ICE Contract

Distribution

- ☐ ProjectWise
- ☐ Program Manager
- ☐ Consultant Services Administrator

Deliverable	Task	Responsible Party	
		Activity Leader	
		Project Manager	Consultant Services Administrator
CMGC RFP	▪ Develop CMGC RFP	X	
Executed CMGC Contract	▪ Select CMGC Contractor	X	
Executed ICE Contract	▪ Select ICE Contractor	X	

Develop the CMGC RFP

Refer to the UDOT CMGC Website for guidance in developing the CMGC RFP

Select CMGC Contractor

Follow the UDOT CMGC procurement process to select a contractor. Refer to the UDOT CMGC Website for guidance.

Select ICE Contractor

Follow the UDOT CMGC procurement process to select an ICE contractor. Refer to the UDOT CMGC Website for guidance.

3Z2 VE Study

(back to table)

Overview

Value Engineering (VE) is the systematic application of recognized techniques to achieve the following:

- Identification of unnecessary project costs
- Identification of VE alternatives that reliably provide necessary functions consistent with quality, reliability, life-cycle cost, and other critical factors required by the project

Project quality and functions are improved while lowering the cost and using fewer resources.
This activity is to identify the need for a VE study, obtain a VE consultant, and conduct the VE study.

References

- ☐ Consultant Services Website
- ☐ Value Engineering Manual of Instruction
- ☐ Life Cycle Cost Information and Guide

Deliverables

- ☐ Executed VE Consultant Contract
- ☐ VE Study Report

Distribution

- ☐ ProjectWise
- ☐ Region Preconstruction Engineer
- ☐ Project Design Engineer
- ☐ VE Coordinator

Deliverable	Task	Responsible Party		
		Activity Leader		
		Project Manager	Design Leader	VE Coordinator
Executed VE Consultant Contract	▪ Select a VE Consultant	X		
VE Study Report	▪ Assemble All Project Information		X	
	▪ Conduct VE Study			X
	▪ Prepare VE Study Report			X
	▪ VE Recommendation Acceptance	X		
	▪ Incorporate VE Recommendations		X	

Select a VE Consultant

Engage a VE consultant. Refer to the *Consultant Services Website* for contracting information.

Assemble All Project Information

- Plans/Design
  - As-Constructed
  - Preliminary
    - Horizontal Alignment
    - Vertical Alignment
    - Typical Sections
  - ROW
  - Utilities
- Detailed Engineer's Estimate
- Topography and Contour Maps (Aerials)
- PDC
- Environmental Resources
- Pavement Design Data
- Structures Information
  - As-Constructed Plans
  - Sufficiency Ratings
- Drainage Data

Conduct VE Study

The VE team conducts the VE study; see the *UDOT VE Manual of Instruction* for more information. For the VE presentation, the following people are required attendees:

- UDOT Upper Management
- Project Manager
- Design Team
- Functional Manager(s)
  - Structures
  - Hydraulics
  - ROW

Prepare VE Study Report

Compile and document the results of the VE study into a report. Include an implementation plan for the study results.

VE Recommendation Acceptance

- Review VE recommendations
- Identify VE recommendations to carry forward
- Develop the justification for VE recommendations that are rejected or modified

Incorporate VE Recommendations

Incorporate the recommendations into the appropriate Set Initial Geometry sub-stage activities.

3Z3 Obtain CE Consultant(s)

(back to table)

Overview

Obtain a construction engineering consultant (if appropriate) who will be contracted during this stage to provide comments regarding constructability issues. The consultant will provide oversight during construction.

References

- ☐ Consultant Services Website

Deliverables

- ☐ Request for Qualifications
- ☐ Executed Contract

Distribution

- ☐ Project File
- ☐ Program Manager
- ☐ Project Manager
- ☐ Consultant Services Administrator

Develop	Task	Responsible Party	
		Activity Leader	
		Project Manager	Consultant Services Administrator
Request for Qualifications	▪ Develop CE RFQ	X	
Executed CE Contract	▪ Select CE Consultant and Execute Contract	X	

Develop CE RFQ

Determine the type of consultant selection. Refer to the *consultant services website* for guidance in developing the CE RFQ.

Select CE Consultant and Execute Contract

Follow the UDOT procurement process to select a consultant, prepare, and negotiate the CE contract. Refer to the *consultant services website* for guidance.

4Z1 Finalize Transportation Management Plan (TMP)

(back to table)

Overview

Finalize the Design Transportation Management Plan (TMP) based on information provided throughout the design process. This involves input from program managers, PI, and adjacent projects to provide direction for finalizing the project's traffic control plan, maintenance of traffic plan, and PI strategies. This does not include the execution or conclusion-report phases of the TMP as defined by UDOT Policy 08-5.

Deliverables

- ☐ Design TMP

Distribution

- ☐ Project File
- ☐ Program Manager

Deliverable	Task	Responsible Party Activity Leader Project Manager
Design TMP	▪ Update and Finalize Design TMP	X
	▪ Disseminate Design TMP to TPT Members	X

Update and Finalize Design TMP

- Incorporate results of 4P1 and 3T1 into the final TMP.
- Create an executive summary of the Design TMP and include the PI Plan, Maintenance-of-Traffic Plan, and Limitations of Operations.

Disseminate Design TMP to TPT Members

Review Design TMP with the Resident Engineer, Traffic and Safety Engineer, and Program Manager and other applicable parties.

4Z2 Retain Construction Public Involvement Consultant (back to table)

Overview

This activity outlines the process for hiring a PI consultant.

References

- ☐ UDOT POP
- ☐ Project POP
- ☐ Public Involvement Resources & Templates
- ☐ Public Involvement Consultants
- ☐ Partners for the Road Ahead Guide

Deliverables

- ☐ Draft Scope of Work
- ☐ Negotiated Contract

Distribution

- ☐ PIM
- ☐ Project Manager
- ☐ Consultant Services or Procurement Administrator (If Applicable)

Deliverable	Task	Responsible Party		
		Activity Leader		
		Project Manger	Project Design PIM	Consultant Services Administrator
Draft Scope of Work	▪ Draft Scope of Work		X	
Negotiated Contract	▪ Determine Consultant Retention Method	X		
	▪ Negotiate Contract	X		

Draft Scope of Work

Draft the scope of work for the construction public involvement consultant. Use the current POP to draft the scope of work and clearly define the following:

- Project goals
- Project summary
- Requirements and expectations of level of effort

Determine Consultant Retention Method

Obtain a consultant through one of the following:

- Consultant Services
- Procurement Bid
- Procurement On-Call

Negotiate Contract

Negotiate the contract based on the draft scope and POP. The negotiated contract must include the following:

- Cost estimate
- Staffing plan
- Schedule

5Z2 Prepare, Submit, and Process for Advertisement

(back to table)

Overview

Advertise the project for bid.

References

- ☐ UDOT Advertisement Checklist
- ☐ Project Advertisements and Selection Notifications Website
- ☐ Consultant Services Website

Deliverables

- ☐ Complete Advertising Package
- ☐ Biddable Project on UDOT Website

Distribution

- ☐ Statewide and Local Newspapers
- ☐ UDOT Website

Deliverable	Task	Responsible Party			
		Activity Leader: Project Manager	Design Leader	Program Finance	Construction Services
Complete Advertising Package	▪ Obtain Advertising Checklist		X		
	▪ Complete Advertising Checklist	X			
	▪ Assemble Advertising Package		X		
Biddable Project on UDOT Website	▪ Process Advertising Package	X			
	▪ Publish Notice to Contractors in Newspaper	X			
	▪ Load Advertising Documents onto UDOT website	X			
	▪ Include Addenda to the Project (when necessary)	X			

Obtain Advertising Checklist

Checklists are available for download for federal, state, and design-build federal projects.

Complete Advertising Checklist

Instructions for completing the checklist for federal and design-build federal projects are available for download. Note the requirements for submitting and distributing addenda to the advertising package. Compile and assemble necessary documents and approvals.

Assemble Advertising Package

Assemble final package for advertisement and create required hard copies.

Process Advertising Package

Work with Construction Services and Program Finance to process the advertising package

Publish Notice to Contractors in Newspaper

Project should be published for two consecutive weeks in the newspapers with statewide distribution and one week with local county newspaper to coordinate with the project site.

Load Advertising Documents onto UDOT Website

Post Notice to Contractors, Plan Set, Planholders List, Bid Items, Project Specifications, and Addendum on UDOT website for contractors to access.

Include Addenda to the Project (when necessary)

Addenda to bid proposals must be mailed, e-mailed, and transmitted by fax to all plan holders at least 11 calendar days preceding the bid opening date.